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| **FACULTY** | ENGINEERING AND ARCHITECTURE PROGRAM |
| **DEPARTMENT** | MINING ENGINEERING DEPARTMENT |

# GENERAL INFORMATION ABOUT PROGRAM

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| **General Information about the Program** |
| To train mining engineers;   * who could have strong social interaction, enough knowledge, skills and competence, * who could take active role in the extraction and processing of mining resources, with scientifically and technologically highest international standard methods, within the principle of occupational health and safety regulations, environment consciously and economically to be served in human needs. * who could also take active role in mining related other areas such as construction of subways, tunnels and dams. |

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| **Facilities Provided By Mining Engineering** |
| Eskişehir is one of the most popular places of Turkey in terms of mining and has important metallic and industrial reserves of boron salts, chromite, magnesite, gold, marble and meerschaum. On the purpose of supporting mining industry, Mining Engineering Department was established in 1975 in Eskişehir. The department has three divisions, namely, Mining, Mineral Processing and Excavation Machines and Mechanization.  The courses have been designed to train mining engineers who operates underground resources consciously and efficiently. Undergraduate courses are given theorically and supplemented with practice. Basic Mineral Engineering courses are given in the first two years of study, and ELECTIVE courses can be selected and to be professionalized in any of the divisions. The department has high technology mineral processing, rock mechanics, mineralogy, ore bed and semi precious gem stones laboratories. Graduates are employed in either government or private mining and/or mineral processing companies in Turkish Mining Industry. Department has its own Mining Engineering Club, organizing social gatherings, plant trips etc. |

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| **Departments of the Mining Engineering** |
| 1- Mining  2- Mineral Processing,  3- Excavation Machines and Mechanization. |

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| **Research Subjects** |
| Major research interests in the department could be summarized as;  Rock mechanics,   * Rock fragmentation and drilling, * Mine mechanization, * Mine environment; mechanics and thermodynamics of air flow systems, mine ventilation, dust, gas, fires, explosions, rescue * Mine economics; evaluation and investment analysis of mineral properties, forecasting and econometric models of mineral markets * Mineral processing; comminution, agglomeration, physical and physicochemical methods, * Coal cleaning, * Chemical mining   Tailing and effluent treatment. |

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| **Objectives Of The Course** |
| * The students have to pass all of the courses in the program and must not have any FF, DZ or YZ grades. In this program, the students should have minimum 240 ECTS and grade points average (gpa) have to be minimum 2 over 4. The students have to complete totally 50 days of internship period, 10 days of topography and 40 days of profession internships. * Taking engineering responsibilities of underground and open-pit mining, ore and coal processing. * Having a command of mining exploration and mapping, controlled blasting for excavation, opening a tunnel and surveying. * Performing the decisions intended to define and solve the problems with analytical approach. * Carrying out the professional planning Projectcts and evaluate economically. * Following technical improvements, making continuous self-improvement and using computer and information technologies. * Having a command of mining law, mining and environment, occupational health and safety, susceptible about society and environment, and having ethics about professions. * Prone to teamwork and having abilities of successful communication in social and professional areas. | |

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| **Language** |
| Turkish |

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| **Research facilities include;** |
| * Mineral Processing Laboratory, * Rock Mechanics Laboratory, * Mine Ventilation Laboratory * Mine Mechanization Laboratory * Training Gallery |

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| **Internship** |
| The students have to pass all of the courses in the program and must not have any FF, DZ or YZ grades. In this program, the students should have minimum 240 ECTS and grade points average (gpa) have to be minimum 2 over 4. The students have to complete totally 50 days of internship period, 10 days of topography and 40 days of profession internships. |

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| **Double Major / Lateral Branch** |
| * Computer Engineering * Electrical & Electronic Engineering * Industrial Engineering * Civil Engineering, * Geological Engineering * Chemical Engineering * Mechanical Engineering * Metallurgical And Materials Engineering |

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| **Careers** |
| Graduates are employed in government offices (Maden Tetkik ve Arama, Türkiye Kömür Işletmeleri, ETI Bor etc.), marble industry, cement industry, metallurgy plants and engineering offices. |

# COURSES and ECTS Credits

The scope, content, evaluation, work load and ECTS Credits can be seen in the below table.

## 1st Year

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fall Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151711195 | Physics I | 3 | 3+0+0 | C | Turkish |
| 151711196 | Physics I Laboratory | 2 | 0+0+2 | C | Turkish |
| 151711210 | Calculus I | 5 | 4+0+0 | C | Turkish |
| 151711197 | Chemistry | 3 | 3+0+0 | C | Turkish |
| 151711198 | Chemistry Laboratory | 2 | 0+0+2 | C | Turkish |
| 151711133 | Tecnical Drawing | 4 | 2+2+0 | C | Turkish |
| 151711211 | Introduction to Mining Engineering and Ethic | 3 | 2+0+0 | C | Turkish |
| 151011209 | [English I](#İngilizce_I) | 3 | 3+0+0 | C | Turkish |
| 151711181 | [Turkish Language I](#Türk_Dili_I) | 2 | 2+0+0 | C | Turkish |
| 151711185 | Seminar I (For Foreign Nation Std.) | 2 | 2+0+0 | C | Turkish |
|  | **Social Elective** |  |  |  |  |
| 151711212 | *Report Writing and Presentation Techniques* | 3 | 2+0+0 | E | Turkish |
| 151711213 | *Basic Photography* | 3 | 2+0+0 | E | Turkish |
| 151711214 | [*Web Design*](#Web_Tasarımı) | 3 | 2+0+0 | E | Turkish |
| 151711215 | *First Aid* | 3 | 2+0+0 | E | Turkish |
| Sum of Fall Semester | | 30 |  |  |  |
| **Spring Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151712196 | [Physics II](#Fizik_II) | 3 | 3+0+0 | C | Turkish |
| l151712197 | Physics II Laboratory | 2 | 0+0+2 | C | Turkish |
| 151712204 | [Calculus II](#Matematik_II) | 5 | 4+0+0 | C | Turkish |
| 151712206 | [Engineering Mechanics](#Mühendislik_Mekaniği) | 5 | 4+0+0 | C | Turkish |
| 151712205 | [Analytical Chemistry](#Analitik_Kimya) | 6 | 3+0+2 | C | Turkish |
| 151712182 | [Turkish Language II](#Türk_Dili_II) | 2 | 2+0+0 | C | Turkish |
| 151012210 | English II | 3 | 3+0+0 | C | Turkish |
| 151712200 | Basic Computer Science | 4 | 2+2+0 | C | Turkish |
| 151712186 | Seminar II (For Foreign Nation Std.) | 2 | 2+0+0 | C | Turkish |
| Sum of Spring Semester: | | 30 |  |  |  |
| SUM OF SEMESTER: | | 60 |  |  |  |

## 2nd Year

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fall Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151713228 | [Mine Development and Excavation](#Madenlerde_Hazırlık_ve_Kazı) | 5 | 3+0+0 | C | Turkish |
| 151713229 | Surface Mining | 5 | 3+0+0 | C | Turkish |
| 151713554 | Mineralogy and Petrography | 5 | 2+0+2 | C | Turkish |
| 151713235 | General Geology | 4 | 3+0+0 | C | Turkish |
| 151713237 | [Mechanics of Materials](#Mukavemet) | 4 | 3+0+0 | C | Turkish |
| 151011208 | [History of Turkish Revolution and Principles of Kemal Atatürk I](#A_İ_İ_T_I) | 2 | 2+0+0 | C | Turkish |
| 151713555 | [Fluid Mechanics](#Akışkanlar_Mekaniği) | 5 | 3+0+0 | C | Turkish |
| Sum of Fall Semester: | | 30 |  |  |  |
| **Spring Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151012209 | [History of Turkish Revolution and Principles of Kemal Atatürk II](#A_İ_İ_T_II) | 2 | 2+0+0 | C | Turkish |
| 151714554 | [Differantial Equations](#Diferansiyel_Denklemler) | 4 | 3+0+0 | C | Turkish |
| 151714555 | Thermodynamics | 3 | 2+0+0 | C | Turkish |
| 151714234 | [Ore Processing I](#Cevher_Hazırlama_I) | 6 | 3+2+0 | C | Turkish |
| 151714237 | Topography | 4 | 2+2+0 | C | Turkish |
| 151714230 | [Underground Mining Methods](#Yeraltı_Üretim_Yöntemleri) | 4 | 3+0+0 | C | Turkish |
| 151714556 | Drilling Technique | 3 | 1+2+0 | C | Turkish |
| 151714557 | Practice I | 4 | - | C | Turkish |
| Sum of Spring Semester: | | 30 |  |  |  |
| SUM OF SEMESTER: | | 120 |  |  |  |

## 3rd Year

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fall Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151715348 | [Structural Geology](#Yapısal_Jeoloji) | 3 | 2+0+0 | C | Turkish |
| 151715349 | Occupational Health and Safety I | 3 | 2+0+0 | C | Turkish |
| 151715331 | Ore Processing II | 6 | 3+0+2 | C | Turkish |
| 151715350 | Technical English | 2 | 2+0+0 | C | Turkish |
| 151715344 | [Rock Mechanics](#Kaya_Mekaniği) | 5 | 3+0+0 | C | Turkish |
| 151715343 | [Probability and Statistics](#Olasılık_ve_İstatistik) | 3 | 2+0+0 | C | Turkish |
|  | **Technical Elective I** |  |  |  |  |
| 151715345 | [*Rock Slope Stability*](#Kaya_Şev_Stabilitesi) | 4 | 3+0+0 | E | Turkish |
| 151715346 | [*Blasting and Environmental Impacts*](#Patlatma_ve_Çevresel_Etkiler) | 4 | 3+0+0 | E | Turkish |
| 151715347 | [*Mine Exploration and Valuation*](#Madenlerin_Aranması_ve_Değerlendirilmesi) | 4 | 3+0+0 | E | Turkish |
|  | **Technical Elective II** |  |  |  |  |
| 151715351 | [*Tunnelling Technology*](#Tünel_Teknolojisi) | 4 | 3+0+0 | E | Turkish |
| 151715352 | *Geological Mapping* | 4 | 3+0+0 | E | Turkish |
| 151715353 | [*Metallic Ores and Beneficiation*](#Metalik_Cevherler_ve_Zenginleştirilmesi) | 4 | 3+0+0 | E | Turkish |
| 151715354 | *Total Quality Management in Mining* | 4 | 3+0+0 | E | Turkish |
| Sum of Fall Semester: | | 30 |  |  |  |
| **Spring Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151716330 | Ore Deposits | 3 | 2+0+0 | C | Turkish |
| 151716332 | Mineral Processing III | 6 | 3+2+0 | C | Turkish |
| 151716334 | [Transportation and Water Drainage in Mines](#Madenlerde_Ulaşım_ve_Su_Atımı) | 4 | 3+0+0 | C | Turkish |
| 151716350 | [Computer Aided Mineral Processing Design](#BİLGİSAYAR_DESTEKLİ_CEVHER_HAZIRLAMA_TAS) | 3 | 1+2+0 | C | Turkish |
| 151716351 | [Techniques of Writing Business Letters](#İngilizce_Yazışma_Teknikleri) | 2 | 2+0+0 | C | Turkish |
| 151716355 | [Practice II](#Staj_II) | 4 | - | C | Turkish |
|  | **Technical Elective III** |  |  |  |  |
| 151716347 | [*Grinding Technology*](#Öğütme_Teknolojisi) | 4 | 3+0+0 | E | Turkish |
| 151716348 | [*Cement Technology*](#Çimento_Teknolojisi) | 4 | 3+0+0 | E | Turkish |
| 151716349 | *Coal Technology* | 4 | 3+0+0 | E | Turkish |
|  | **Technical Elective IV** |  |  |  |  |
| 151716352 | [*Marble Production and Processing Techniques*](#Mermer_Üretim_ve_İşleme_Teknikleri) | 4 | 3+0+0 | E | Turkish |
| 151716353 | *Mine Systems Analysis* | 4 | 3+0+0 | E | Turkish |
| 151716354 | [*Soil Mechanics*](#Zemin_Mekaniği) | 4 | 3+0+0 | E | Turkish |
| Sum of Spring Semester: | | 30 |  |  |  |
| SUM OF SEMESTER: | | 180 |  |  |  |

## 4th Year

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fall Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151717630 | [Mining Machines](#Maden_Makinaları) | 4 | 3+0+0 | C | Turkish |
| 151717419 | Mine Ventilation | 6 | 4+0+0 | C | Turkish |
| 151717631 | Design of Supports in Mines and Tunnels | 6 | 4+0+0 | C | Turkish |
| 151717641 | [Mining and Labor Law](#Maden_ve_İş_Hukuku) | 3 | 2+0+0 | C | Turkish |
|  | **Technical Elective V** |  |  |  |  |
| 151717632 | [*Design of Experiment in Mineral Processing*](#Cevher_Zenginleştirmede_Deney_Tasarımı) | 4 | 3+0+0 | E | Turkish |
| 151717633 | *Industrial raw materials and processing tecnniques* | 4 | 3+0+0 | E | Turkish |
| 151717634 | [*Ceramics Technology*](#Seramik_Teknolojisi) | 4 | 3+0+0 | E | Turkish |
|  | **Technical Elective VI** |  |  |  |  |
| 151717635 | *Mineral Charac. and Anal. Tech.* | 4 | 3+0+0 | E | Turkish |
| 151717636 | *Material and Metallurgy* | 4 | 3+0+0 | E | Turkish |
| 151717637 | [*Modelling in Mineral Processing*](#Cevher_Hazırlamada_Modelleme) | 4 | 3+0+0 | E | Turkish |
|  | **Technical Elective VII** |  |  |  |  |
| 151717638 | *Wastewater Treatment* | 3 | 2+0+0 | E | Turkish |
| 151717639 | [*Environmental Problems in Mining*](#Madencilikte_Çevre_Sorunları) | 3 | 2+0+0 | E | Turkish |
| 151717640 | [*Environment and Safety in Mining*](#Madencilikte_Çevre_ve_Emniyet) | 3 | 2+0+0 | E | Turkish |
| Sum of Fall Semester: | | 30 |  |  |  |
| **Spring Semester** | | | | | |
| Code | Course Name | ECTS | T+P+L | C/E | Language |
| 151718549 | Excavation Machines and Mechanization | 4 | 3+0+0 | C | Turkish |
| 151718550 | Mining Economy | 3 | 2+0+0 | C | Turkish |
| 151718551 | [Computer Aided Mine Design](#Bilgisayar_Destekli_Maden_İşletme_Tasarı) | 4 | 1+2+0 | C | Turkish |
| 151718552 | Occupational Health and Safety II | 3 | 2+0+0 | C | Turkish |
|  | **Technical Elective VIII** |  |  |  |  |
| 151718553 | [*Solid-Liquid Separation*](#Katı_Sıvı_Ayırımı) | 4 | 3+0+0 | E | Turkish |
| 151718554 | *Mineral Processing Plants* | 4 | 3+0+0 | E | Turkish |
| 151718555 | [*Mineral Processing Plant Design*](#Cevher_Hazırlama_Tesis_Proje) | 4 | 3+0+0 | E | Turkish |
|  | **Technical Elective IX** |  |  |  |  |
| 151718556 | [*Chemical Mining*](#Kimyasal_Madencilik) | 4 | 3+0+0 | E | Turkish |
| 151718557 | [*Gemstones and Works*](#Süs_Taşları_ve_İşleme_Teknikleri) | 4 | 3+0+0 | E | Turkish |
| 151718558 | [*Agglomeration*](#Boyut_Büyütme) | 4 | 3+0+0 | E | Turkish |
|  | **Social Elective II** |  |  |  |  |
| 151718559 | *Innovation and Entrepreneurship* | 2 | 2+0+0 | E | Turkish |
| 151718560 | *Project and Risk Management* | 2 | 2+0+0 | E | Turkish |

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| Code | Course Name | ECTS | T+P+L | C/E | Language |
|  | **Engineering Researches** |  |  |  |  |
| 151718520 | Mine Development and Excavation Researches | 6 | 1+4+0 | E | Turkish |
| 151718521 | Rock Mechanic Researches | 6 | 1+4+0 | E | Turkish |
| 151718522 | Pelletizing Analysis | 6 | 1+4+0 | E | Turkish |
| 151718523 | Coal Technology Researches | 6 | 1+4+0 | E | Turkish |
| 151718524 | Crushing-Grinding Analyses | 6 | 1+4+0 | E | Turkish |
| 151718525 | Underground Mining Analysis | 6 | 1+4+0 | E | Turkish |
| 151718526 | Solid-Liquid Analysis | 6 | 1+4+0 | E | Turkish |
| 151718527 | Mine Transportation Analysis | 6 | 1+4+0 | E | Turkish |
| 151718528 | Mine Ventilation Researches | 6 | 1+4+0 | E | Turkish |
| 151718529 | Open Pit Machines Analysis | 6 | 1+4+0 | E | Turkish |
| 151718530 | Size Reduction Analysis | 6 | 1+4+0 | E | Turkish |
| 151718531 | Mining Economy Analysis | 6 | 1+4+0 | E | Turkish |
| 151718532 | Mineral Classification Analysis | 6 | 1+4+0 | E | Turkish |
| 151718533 | Agglomeration Analyses. | 6 | 1+4+0 | E | Turkish |
| 151718534 | Industrial Raw Materials Analyses | 6 | 1+4+0 | E | Turkish |
| 151718535 | Chemical Concentration Analysis | 6 | 1+4+0 | E | Turkish |
| 151718536 | Mining Machines Analysis | 6 | 1+4+0 | E | Turkish |
| 151718537 | Magnetic Separation Researches. | 6 | 1+4+0 | E | Turkish |
| 151718538 | Flotation Design | 6 | 1+4+0 | E | Turkish |
| 151718539 | Support Analysis in Mines | 6 | 1+4+0 | E | Turkish |
| 151718540 | Surface Mining Researches. | 6 | 1+4+0 | E | Turkish |
| 151718543 | Flocculation Analysis | 6 | 1+4+0 | E | Turkish |
| 151718545 | Heavy (or Dense) Medium Separation (HMS) Recourses | 6 | 1+4+0 | E | Turkish |
| 151718546 | Rock Slope Stability Researches | 6 | 1+4+0 | E | Turkish |
| 151718547 | Metallic Mineral Beneficiation Researches | 6 | 1+4+0 | E | Turkish |
| 151718548 | Occupational Health and Safety Researches | 6 | 1+4+0 | E | Turkish |
| Sum of Spring Semester: | | 30 |  |  |  |
| SUM OF SEMESTER: | | 240 |  |  |  |

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# Physics I

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| **COURSE CODE** | 151711195 | **COURSE NAME** | Physics I |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 3 | |  |  | 3 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
| X | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Measurement and units; vectors; Kinematics; Dynamics; Work and Energy; Linear Momentum and Collisions; Rotational Motion; Equilibrium; Oscillatory Motion | | | | | |
| **COURSE OBJECTIVE** | | | | To teach the basic concepts and laws of physics and practices of daily life. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | In practice, varieties of physical systems to recognize and solve problems and at the same time improve their ability to practice in daily life. Using them, students will realize the role of physics in applied sciences such as health sciences and engineering. | | | | | |
| **COURSE OUTCOMES** | | | | Students realize of the variety problems of physical systems and solve these problems.  Understands the importance of measurement and the units.  Physical systems apply in their personal daily life.  Recognizes the role of physics in engineering and health sciences.  The basic laws of physics and concepts. | | | | | |
| **TEXTBOOK** | | | | Sears and Zemansky’s UNIVERSITY PHYSICS WITH MODERN PHYSICS 12TH Edition, PEARSON Addison Wesley (2008). | | | | | |
| **SUPPORTING REFERENCES** | | | | **Halliday, D. , Resnick, R., & Walker, J. (2006) 6th ed.** Fundamentals of Physics. New York: John Wiley & Sons, Inc.  **Serway, R.A. (1990). Physics for Scientists and Engineers. Philadelphia: Saunders College Publishing.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Measurement and units |
| 2 | Vectors |
| 3 | Motion in One Dimension |
| 4 | Motion in Two Dimensions |
| 5 | Newton’s Laws |
| 6 | Work and Power |
| 7 | Energy |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Linear Momentum and Collisions |
| 11 | Rotational Motion |
| 12 | Applications of Rotational Motion |
| 13 | Equilibrium |
| 14 | Oscillatory Motion |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [x] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [x] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [x] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [x] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Physics I Laboratory

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| **COURSE CODE** | 151711196 | **COURSE NAME** | Physics I Laboratory |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 0 | | 0 | 2 | 1 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
| X | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | | 7 | 50 | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | General instructions; measurements; free fall and projectile motion; Newton’s second law; the simple pendulum and moment of inertia; hooke’s law and spiral spring; viscosity | | | | | |
| **COURSE OBJECTIVE** | | | | learning the basic principles and concepts of physics | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To use existing technology and to produce new technologies. | | | | | |
| **COURSE OUTCOMES** | | | | To explain natural phenomena and analysis learn the science of physics, Understanding of scientific method and research skills. | | | | | |
| **TEXTBOOK** | | | | **M.C.Baykul, E.Alğın, S.Eroğlu, C.Aşıcı, Physics I-II Lab Manuel foe scientist and engineers,** Eskisehir Osmangazi University | | | | | |
| **SUPPORTING REFERENCES** | | | | Ekem, N. Ve Şenyel, M., **Fizik I-II Deneyleri** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | General instructions |
| 2 | measurements |
| 3 | free fall and projectile motion |
| 4 | free fall and projectile motion |
| 5 | Newton’s second law |
| 6 | Newton’s second law |
| 7 | the simple pendulum and moment of inertia |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | the simple pendulum and moment of inertia |
| 11 | hooke’s law and spiral spring |
| 12 | hooke’s law and spiral spring |
| 13 | viscosity |
| 14 | viscosity |
| 15,16 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [x] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [x] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [x] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [x] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

**Date:**

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# Calculus I

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| **COURSE CODE** | 151711210 | **COURSE NAME** | Calculus I |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 4 | | 0 |  | 4 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Functions, Limits and Continuity, Derivation and Applications of differentiation, Definite and indefinite integrals, Applications of integration, improper integrals, polar coordinates | | | | | |
| **COURSE OBJECTIVE** | | | | The main of the course is to introduce the concepts and techniques involved in the basic topics listed in this lecture and to develop skills in applying those concepts and techniques to the solution of problems | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To apply theoretical and practical knowledge on solving and modeling of engineering problems by using sufficient knowledge of engineering subjects related with mathematics | | | | | |
| **COURSE OUTCOMES** | | | | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | | | | | |
| **TEXTBOOK** | | | | Balcı, M.,2008, Genel Matematik 1, Balcı Yayınları,Ankara | | | | | |
| **SUPPORTING REFERENCES** | | | | Balcı, M.,2007, Genel Matematik Problemleri 1, Balcı Yayınları, Ankara | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

|  |  |
| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Functions |
| 2 | Essential functions and their graphs |
| 3 | Trigonometric, Exponential, Logarithmic and Hyperbolic functions |
| 4 | Limits |
| 5 | Continuity |
| 6 | Derivatives and differentiation formulas |
| 7 | Derivatives of Trigonometric, Exponential, Logarithmic and Hyperbolic functions |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | L’Hospital’s Rule, A geometric approach to the derivative, problems involving maxima and minima |
| 11 | Drawing curve, indefinite integrals |
| 12 | Integration formulas, definite integrals |
| 13 | Applications of integration |
| 14 | Improper integrals, polar coordinates |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ x] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ x] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [x] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [x] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Chemistry

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| **COURSE CODE** | 151711197 | **COURSE NAME** | Chemistry |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 3 | | 0 | 0 | 3 | 3 | COMPULSORY() ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Properties of matter and their measurement, change of matter, atom and atom theories, nolecules, ions, izotopes, periyodical table/system, chemical compounds, bonds, polar and non polar substances, electronegativity, surface tension, contact angle, hydrophobicity, liquid phase, water and water technologies, solutions, acids and basics, basic chemical laws, gas phase, chemical reactions and stoickometic calculations, chemistry in our live, cleaning aids, common building materials and environment fiendly plastics. | | | | | |
| **COURSE OBJECTIVE** | | | | Basic chemistry knowledge, chemical laws, chemical reactions and stoichiometric calculations, for engineers are introduced. Atoms, compounds, solid-liquid-gas phase properties and periodical system are covered. Water, water technology, chemistry in our lives, cleaning aids and common building materials are included. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | General chemistry is a compulsory course for Mining Engineering education in the world. For the professional training point of view, learning the theory and practical applications of the chemistry are very important subject for students. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Description, definition and classification of matter and its properties.  2. Learning atom and atoms properties.  3. Definition and use of molarity, Avagadro law.  4. Classification of chemical compounds.  5. Definition and classification of chemical, organic and inorganic compounds.  6. Properties of gas phase. Gas pressure, ideal gas law.  7. Gas mixtures calculations.  8. Stoichiometric calculations.  9. Introduction to water and water technology.  10. Chemistry in our lives and common building materials. | | | | | |
| **TEXTBOOK** | | | | Kaya M. ve Taşdemir A. (2009), Mühendisler için Genel Kimya | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Petrucci H., Harwood W.S., Herring F.G., “Genel Kimya: Ilkeler ve Modern Uygulamalar (I-II. Cilt)”, Çev. Ed.: Uyar T., Aksoy S., Palme Yay., Ankara 2002  2. Mortimer, C.E., Modern Üniversite Kimyasi (I-II Cilt) , Çev.Çağlayan Kitabevi, Istanbul, 1988.  3. Sienko M.J., Plane R.A., “Temel Kimya”, Çeviri, Savaş Yay., Ankara, 1983  4. Erdik, E., Sarikaya, Y., “Temel Üniversite Kimyasi”, Hacettepe Taş  Kitapçilik, Ankara, 1987. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Materials and its properties, separation of materials |
| 2 | Atoms and molecules; bonds, polar and non-polar substances; electronegativity, periodic system |
| 3 | Surface tension, contact angle, adhesion-cohesion, hydrophobicity |
| 4 | Liquid phase, water hardness, water softening, water technologies |
| 5 | Solutions, asids-bases, molarity, titration, hydrolises, dispersion and flocculation |
| 6 | Basic chemical laws, ionisation |
| 7 | Gas phase and gas laws |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Evaporation, stoichiometric calculations |
| 11 | Stoichiometric calculations |
| 12 | Chemistry in our lives, cleaning aids |
| 13 | Common building materials (lime, glassi ceramics and paints) |
| 14 | Common building materials (jipsum, alloys, plastics), nano-technology |
| 15,16 | Final Exam |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [x] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [x] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [x] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Chemistry Laboratory

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| **COURSE CODE** | 151711198 | **COURSE NAME** | Chemistry Laboratory |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 0 | | 0 | 2 | 1 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
| X | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | | 1 | 40 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The law of definite proportions, determination of molar volume and ideal gas constant, determination of equivalent weight of a metal, factors affecting the rate of reaction, Hess’ law of heat summation, qualitative analysis, titrimetric analysis, Charles’ law | | | | | |
| **COURSE OBJECTIVE** | | | | Apply knowledge of chemistry given in the chemistry course | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To teach making experiments, interpretation and prepare the report. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learning the rules that should be taken into account in the laboratory 2. Application of theorical knowledge learned to the experiments 3. Interpretation of experiment results and prepare them as a report | | | | | |
| **TEXTBOOK** | | | | O. Inel, “Genel Kimya Laboratuvar kilavuzu” Eskişehir. | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The law of definite proportions |
| 2 | The law of definite proportions |
| 3 | Determination of molar volume and ideal gas constant |
| 4 | Determination of molar volume and ideal gas constant |
| 5 | Qualitative analysis |
| 6 | Qualitative analysis |
| 7 | Titrimetric analysis |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Titrimetric analysis |
| 11 | Determination of equivalent weight of a metal |
| 12 | Determination of equivalent weight of a metal |
| 13 | Charles’ law |
| 14 | Charles’ law |
| 15,16 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [x] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [x] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [x] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Tecnical Drawing

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| **COURSE CODE** | 151711133 | **COURSE NAME** | Technical Drawing |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 2 | | 2 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | General definitions in technical drawing; standard text and lines; geometrical drawings, projection methods, extraction of 3D faces, perspectives, perspective drawing, dimensioning | | | | | |
| **COURSE OBJECTIVE** | | | | To teach students the importance of Technical Drawing in engineering. To develop students skill of technical drawing and reading. To convey mining engineering profession’s picture to students along Technical Drawing. To inform students about both Technical Drawing standards and Non-Technical Drawing standards. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students taking the course can both draw Technical Drawing and read. | | | | | |
| **COURSE OUTCOMES** | | | | Ability to understand the importance of technical drawing in engineering.  Ability to draw technical drawing.  Ability to read technical drawing.  Ability to think three dimension spaces.  Ability to draw sectional view from any drawing.  Ability to understand importance of standards. | | | | | |
| **TEXTBOOK** | | | | Kiraç, N., (2005). Teknik Resim, Nobel Yayinlari, Ankara. | | | | | |
| **SUPPORTING REFERENCES** | | | | Küçük, M., (2003). Teknik Resim. MEB Devlet Kitaplari, Ankara. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction of Technical drawing. |
| 2 | General definitions: Technical Drawing Tools, Standards, Papers, Fonts, Lines |
| 3 | Introduction to geometric drawings and applications |
| 4 | Continue to geometric drawings and applications |
| 5 | Introductions to projections, types of projection and applications |
| 6 | Introduction to multi-views |
| 7 | Multi-views applications |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Introduction to pictorial drawings |
| 11 | Pictorial drawings applications |
| 12 | Introduction to sectional views, Types of sectional views, Rules of sectional views and applications |
| 13 | Introduction to dimensioning, International measurement systems, dimensioning rules |
| 14 | Dimensioning applications |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [x] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [x] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [x] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [x] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Introduction to Mining Engineering and Ethic

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| **COURSE CODE** | 151711211 | **COURSE NAME** | Introduction to Mining Engineering and Ethic |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 30 | |
| Quiz | | |  |  | |
| Homework | | | 2 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Basics of mineral processing including sampling, particle size analysis, liberation, size reduction; crushing and grinding, size separation; screening, classification and basic principle of physical and chemical processes (Hand sorting, gravity separation, dense medium separation, magnetic separation, electrostatic separation and chemical mining) used in mineral concentration. | | | | | |
| **COURSE OBJECTIVE** | | | | To give information about duties and responsibilities of mining engineer,  To give fundamental information about some units, important terms and techniques,  To give basic knowledge about courses year ahead. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Contribution to have fundamental knowledge about mining engineering and its duties and responsibilities,  Contribution to have fundamental knowledge about courses year ahead. | | | | | |
| **COURSE OUTCOMES** | | | | Have knowledge about mining engineering occupation,  Have knowledge about duties and responsibilities of occupation,  Have fundamental knowledge about units, terms and techniques related to occupation. | | | | | |
| **TEXTBOOK** | | | | Hartman, H. L, 2002, “Introductory Mining Engineering”, [John Wiley & Sons](http://193.140.121.134/yordambt/liste.php?&-sayfa=01&Alan3=&Alan5=&anatur=&bolum=&alttur=&sekil=&ortam=&dil=&yayintarihi=&kgt=&gorsel=&kurumyayini=&cAlanlar=Mining%20Engineering&aa=eseradi&universite=&enstitu=&anabilimdali=&bilimdali=&sureliilkharf=&sure=&biryil=&birdergitrh=&birsayi=&biricindekiler=&-maxmax=16&-skip=0&-max=16&yayinlayan=John%20Wiley%20&%20Sons), [New York](http://193.140.121.134/yordambt/liste.php?&-sayfa=01&Alan3=&Alan5=&anatur=&bolum=&alttur=&sekil=&ortam=&dil=&yayintarihi=&kgt=&gorsel=&kurumyayini=&cAlanlar=Mining%20Engineering&aa=eseradi&universite=&enstitu=&anabilimdali=&bilimdali=&sureliilkharf=&sure=&biryil=&birdergitrh=&birsayi=&biricindekiler=&-maxmax=16&-skip=0&-max=16&yayinyeri=New%20York), 570 p.  Lecture notes. | | | | | |
| **SUPPORTING REFERENCES** | | | | Wills, B. A. (1997). Mineral Processing Technology, 6th Edition.  Kelly, E. G. & Spottiswood, D. J. (1982). Introduction to Mineral Processing,  Özdağ H. (1995). Cevher Hazirlama I, OGÜ yayinlari.  Documents downloaded from World Wide Web (WWW) | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction (Department, courses, ESOGÜ Student Regulations) |
| 2 | Introduction (Mineral processing, mining, some units and their conversion) |
| 3 | Sampling (definitions of mine, mine deposit, resource and reserve) |
| 4 | Particle size analysis (definitions of mine, mine deposit, resource and reserve) |
| 5 | Comminution (Crushing + Grinding) (definitions of mine, mine deposit, resource and reserve) |
| 6 | Comminution (Crushing + Grinding) (definition of engineer and mining engineer) |
| 7 | Screening and classification (properties of mining sector) |
| 8 | Physical and chemical processes employed in mineral processing (Production methods) |
| 9 | Physical and chemical processes employed in mineral processing (basic definition of methods) |
| 10 | Physical and chemical processes employed in mineral processing (Open pit mine) |
| 11 | Physical and chemical processes employed in mineral processing (Underground mine) |
| 12 | Midterm Exam |
| 13 | Physical and chemical processes employed in mineral processing (mine resource in Turkey) |
| 14 | Physical and chemical processes employed in mineral processing (mine resource in Turkey) |
| 15,16 | Final exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [x] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [x] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [x] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# English I

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| **COURSE CODE** | 151011209 | **COURSE NAME** | English I |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 3 | | 0 | 0 | 0 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Fundamental concepts and knowledge | | | | | |
| **COURSE OBJECTIVE** | | | | This lesson is programmed to give the basic vocabulary and grammar and make the students hear, understand, speak and write in English at elementary level. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course is aimed at :  Using the basic grammar rules  The ability to use the target language in an English setting  Understanding and making dialogues  The ability to understand what’s read  The ability to communicate with English-speaking people  The ability to write in the target language. | | | | | |
| **COURSE OUTCOMES** | | | | At the end of the course studends are able to:   * Use the basic grammar rules * Understand and make dialogues * Read and apprehend reading materials * Communicate through writing and speaking | | | | | |
| **TEXTBOOK** | | | | Essential English, Beginner Student’s Book, Richmond Publishing  Essential English, Workbook, Richmond Publishing | | | | | |
| **SUPPORTING REFERENCES** | | | | Murphy, R., 2004, **English Grammar in Use**, Cambridge University Press,  **Dictionary of Contemprary English**, Longman.  Start Up Comprehensive English Practice**, 2007, Nüans Publishing** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Course book, workbook, CD player, loudspeakers, dictionary. | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Subject Pronouns, indefinite article, a/an, *To be*, NICE TO MEET YOU |
| 2 | Verb be ( am, is, are ) I’M FINE THANKS |
| 3 | Plurals, Wh questions, this, that, these, those WHAT IS THIS IN ENGLISH ? |
| 4 | Verb be, Wh questions, Nationalities WHERE ARE YOU FROM |
| 5 | Modals: can, can’t I’M A JOURNALIST |
| 6 | Prepositions of time and place. On, in, at ALL ABOUT YOU |
| 7 | Simple present tense. Who IN PARIS ON THURSDAY |
| 8 | Mid Term Exam |
| 9 | Mid Term Exam |
| 10 | Possessive pronouns, Possessive ‘s HOW OLD IS HE ? |
| 11 | Present Simple tense, questions, short answers HIS MUSIC, HER SHOW, THEIR CHARITIES |
| 12 | Present simple, DO YOU HAVE A BIG FAMILY ? |
| 13 | Present Simple, Wh questions MEET YOUR PERFEC PARTNER |
| 14 | Present Simple, Revision WHAT DO YOU DO AT THE WEEKEND |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [x] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Turkish Language I

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| **COURSE CODE** | 151711181 | **COURSE NAME** | Turkish Language I |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 2 | | 0 | 0 | 0 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Definition of language, language families on the world and Turkish’s place among the world languages, the historical development of Turkish written language, phonetic word recognition events in Turkish. Gain the ability to write proper composition. | | | | | |
| **COURSE OBJECTIVE** | | | | Informing students about the current state of development and the richness of Turkish language, bring awareness of a national language, literally to know about the subtleties about Turkish and be able to use them in their daily lives to ensure. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Provides to students speak and write Turkish correctly write in their daily lives, gain the ability to express themselves in the best way to themselves and their works in their jobs. | | | | | |
| **COURSE OUTCOMES** | | | | Students will express language families on the world and Turkish’s place among the world languages. Define the rules of Turkish. Makes a difference to sound events  Apply the spelling rules.  Spelling rules apply.  Create written and oral composition. Use the language correctly. | | | | | |
| **TEXTBOOK** | | | | Kültür, M. E., 1997, **Üniversiteler İçin Türk Dili,** Bayrak Yayınları, İstanbul. | | | | | |
| **SUPPORTING REFERENCES** | | | | Kaplan, M., 1993, **Kültür ve Dil**, 8. baskı, Dergah Yayınları, İstanbul.  Fuat, M., 2001, **Dil Üstüne**, Adam Yayınları, İstanbul. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | DVD, VCD, projector, computer | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Definition and Characteristics of Language |
| 2 | Languages on the world and Turkish’s place among the world languages from origin and structure sides |
| 3 | Language Importance for culture and nationality, Language Policies |
| 4 | Speech Language and Specifications (Polish, Accent, Oral) |
| 5 | Writing Language and Specifications |
| 6 | Classification of Sounds |
| 7 | Volume Changes, Sound Events |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Rules of Writing |
| 11 | Rules of Writing |
| 12 | Rules of Writing |
| 13 | Written Composition Studies |
| 14 | Studies of planned essay writing |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [x] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [x] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [x] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [x] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Report Writing and Presentation Techniques

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| **COURSE CODE** | 151711212 | **COURSE NAME** | Report Writing and Presentation Techniques |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 2 | | 0 | 0 | 0 | 3 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | | 1 | 30 | |
| Project | | |  |  | |
| Report | | | 1 | 30 | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | |  |  | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to report writing and some basic definitions, writing a report about research subjects, organizing a report , important steps in a report writing, references in reports, teaching how to develop a report in terms of including and formats. Effective presentation techniques, how to organizing a presentation, important highlights and hints about presentation. | | | | | |
| **COURSE OBJECTIVE** | | | | Developing a report writing and having a presentation experience in class. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Developing, writing and organizing a report in a specific subject. Effectively, having some skills for oral presentation | | | | | |
| **COURSE OUTCOMES** | | | | Developing and writing a research report  Learn and organize a report  Developing basic skills for including and format for report writing  References in reports  Effective presentation techniques.  Organization in a presentation | | | | | |
| **TEXTBOOK** | | | | Sariçiçek , I., Rapor Yazma Tekniği ders notlari, 2004 | | | | | |
| **SUPPORTING REFERENCES** | | | | Michael S, Daha iyi nasil…, Sunum yapma, tercüme:Ali Çimen, Timaş yayinlari Istanbul, 1999. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The importance of writing a report |
| 2 | Principles and aims in a writing report |
| 3 | “Content” in a report |
| 4 | Organizing and arranging a report |
| 5 | Front sections, main body and rear sections in reports. |
| 6 | 1. Assignment: A writing a report in a selected subject |
| 7 | The aim of a presentation |
| 8 | Methods and techniques of presentation |
| 9 | Organizing and arranging a presentation |
| 10 | General matters to be taken into account while considering a presentation |
| 11 | Preparation a presentation for selected subject |
| 12 | 2. make a presentation (each student) |
| 13 | Evaluation and criticizing each presentation |
| 14 | 2. make a presentation (each student) |
| 15,16 | Evaluation and criticizing each presentation |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [X] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [X] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Basic Photography

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| **COURSE CODE** | 151711213 | **COURSE NAME** | Basic Photography |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 2 | | 0 | 0 | 0 | 3 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 25 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 25 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Basic description of photography, demonstration of camera and accessories, photography techniques, development of photo assessment skill | | | | | |
| **COURSE OBJECTIVE** | | | | Basic purpose of this course is to educate the students about photography that is a part of daily life and to give the students an opportunity to deal with an art. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | All engineers use visual materials in the solution of technical problems. To prepare correct visual materials requires to have necessary technical knowledge and ability to apply these knowledge | | | | | |
| **COURSE OUTCOMES** | | | | 1. Having knowledge of photo, photography, cameras and accessories, photography techniques 2. Development of picture taking skill 3. Development of photo assessment skill 4. To popularize the art of photography | | | | | |
| **TEXTBOOK** | | | | Course Notes | | | | | |
| **SUPPORTING REFERENCES** | | | | National and international photography web sites | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Projector | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Definition and development of photo |
| 2 | Cameras and basic accesories |
| 3 | Aperture, shutter speed and precision of sensor |
| 4 | Exposure, exposure measurement, exposure correction and photo modes |
| 5 | Focus and focus systems |
| 6 | Light, light measurement systems and illumination systems in photography |
| 7 | Practical information about photography |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Photo samples and assessment |
| 11 | Photo samples and assessment |
| 12 | Photos taken by students and assessment of these photos |
| 13 | Photos taken by students and assessment of these photos |
| 14 | Photos taken by students and assessment of these photos |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [X] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Web Design

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 151711214 | **COURSE NAME** | Web Design |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 2 | | 0 | 0 | 0 | 3 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 30 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | | 1 | 40 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 30 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | HTML tags, layout design using text and format tags, create links, table forming, form elements, frames, Cascading Style Sheets (CSS), multimedia tools, basic tools and web design softwares for web editors. | | | | | |
| **COURSE OBJECTIVE** | | | | Learn HTML (Hyper Text Markup Language) tags used for web design.  Use CSS code which is a style sheet language used for describing the presentation of a document written in a markup language.  Know important rules and points which have to be obeyed in web design.  Create a static web site using HTML tags.  Use web design softwares.  Upload the web site to any remote server and publish website on the internet. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Web Design course is part of the Social Elective courses. This is a course that can contribute to personal development of students consistently to the social elective course aims. A student who knows the web technologies will be able to use the acquired knowledge with professional work life and social life successfully. | | | | | |
| **COURSE OUTCOMES** | | | | * Know HTML tags, * Controls the appearance of web pages using HTML tags and CSS, * Adds link to a web page, * Creates Table, * Adds Forms, * Creates the frame structure, * Design Web Site using the necessary softwares. | | | | | |
| **TEXTBOOK** | | | | |  |  | | --- | --- | | w3schools.com - HTML | * [HTML4 and HTML5 Tutorial](http://www.w3schools.com/html/default.asp) * [HTML (Tag) Reference](http://www.w3schools.com/tags/default.asp) * [HTML Examples](http://www.w3schools.com/html/html_examples.asp) | | w3schools.com - CSS | * CSS Tutorial * CSS Examples | | Video Training Series (Youtube) | * [Adobe Dreamweaver](http://www.youtube.com/playlist?list=PLE8498E4C79C0C82F) (Web editor) * [AdobeMuse](http://www.youtube.com/playlist?list=PL9C7C0DE72F51BEA4) * [Web Design](https://www.youtube.com/watch?v=rfsQHHi3tPE) Example * [Web site files (Web001)](http://www.madran.net/wp-content/uploads/2014/02/ornek_uygulama_web001.zip) | | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, free softwares used in web design. | | | | | |

|  |  |
| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | HTML basic tags, – Command Structure, HTML rules and FTP softwares |
| 2 | Text style and format |
| 3 | Adding links (hyperlinks) |
| 4 | Table construction |
| 5 | Forms |
| 6 | Frames |
| 7 | Style Sheets – CSS |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Multimedia tools – Inserting image, video and sound |
| 11 | Web Design using “Dreamweaver” |
| 12 | Web Design using “Dreamweaver” |
| 13 | Web Design using “Adobe MuSe” |
| 14 | Web Design using “Adobe MuSe” |
| 15,16 | Web Design using “Google Web Designer” |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [x] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [x] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [x] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [x] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

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# First Aid

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| **COURSE CODE** | 151711215 | **COURSE NAME** | First Aid |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 1 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | In this course, teaches to first aid knowledge and skills which contains sick or injured person until medical help to save lives, maintain safety of the injured person. | | | | | |
| **COURSE OBJECTIVE** | | | | This course aim is to teach first-aid knowledge and skills to healthy individuals which may experience a sudden health problems (Cardiac and respiratory arrest, bleeding, drowning, poisons, burns, fractures etc.) in their daily lives | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | * Identify term to first aid and first aider * Identify briefly anatomy and physiology of the human body * Assessment of the injured and scene of accident * Perform basic life support (Cardio-pulmoner resuscitation) * Know a foreign object blocking the airway by removing the object first aid procedure * Know to practises of first aid in near drowning * Know to practises of first aid in bleeding * Know to practises of first aid in shock * Know to practises of first aid in injuries * Know to practises of first aid in poisons * Know to practises of first aid in insect and animal to bite and stings * Know to practises of first aid in burns * Know to practises of first aid in heat stroke and frostbite * Know to practises of first aid in fractures, dislocations and sprains * Know to practises of first aid in a foreign object to eyes, nose and ears * Know to practises of first aid in other emergencies (Fainting, Hyperglycemia, Hypoglycemia, epilepsy seizures, heart attack fever etc.) | | | | | |
| **TEXTBOOK** | | | | Erdil F, Bayraktar N, Çelik SŞ, 2009, Temel İlk Yardım. Eflatun Yay, Ankara | | | | | |
| **SUPPORTING REFERENCES** | | | | * Kocatürk C (2005) İlk Yardım El Kitabı. Ohan Matbaacılık, İstanbul. * Tabak S, Somyürek İ (2008) Temel İlk Yardım ve Acil Bakım. Palme Yayıncılık, Ankara. * American Heart Association Guidelines CPR and ECC (2020). <https://www.ahajournals.org/doi/10.1161/CIR.0000000000000918> | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Barcovision, Modals of First aid | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to the course, information about the content and process,term to first aid and first aider. |
| 2 | Assessment of the injured and scene of accident, first aid bag, Briefly anatomy and physiology of the human body |
| 3 | Basic life support (Cardio-pulmoner resuscitation) |
| 4 | Basic life support (Cardio-pulmoner resuscitation) (continue) |
| 5 | Basic life support (Cardio-pulmoner resuscitation) (practice) |
| 6 | A foreign object blocking the airway by removing the object first aid procedure |
| 7 | Practises of first aid in bleeding and shock |
| 8 | Mid Term Exam |
| 9 | Practises of first aid in injuries |
| 10 | Practises of first aid in poisons and near drowning |
| 11 | Practises of first aid in burns, heat stroke and frostbite |
| 12 | Practises of first aid in fractures, dislocations and sprains |
| 13 | First aid in other emergencies (chest pain, hypoglycemia, hyperglycemia, epileptic convulsion, hyperthermia, fainting) |
| 14 | First aid in transport and lifting techniques |
| 15,16 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [x] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [x] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [x] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Physics II

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| **COURSE CODE** | 151712196 | **COURSE NAME** | Physics II |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 3 | | 0 | 0 | 3 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
| X | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Electric Charges; Coulomb’s Law; The Electric Field; Electric Potential; Capacitance and Dielectrics; Current and Resistance; Magnetic Fields; Sources of the Magnetic Field; Faraday’s Law | | | | | |
| **COURSE OBJECTIVE** | | | | To teach the basic concepts and laws of physics and practices of daily life. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | In practice, varieties of physical systems to recognize and solve problems and at the same time improve their ability to practice in daily life. Using them, students will realize the role of physics in applied sciences such as health sciences and engineering. | | | | | |
| **COURSE OUTCOMES** | | | | Students realize of the variety problems of physical systems and solve these problems.  Understands the importance of measurement and the units.  Physical systems apply in their personal daily life.  Recognizes the role of physics in engineering and health sciences.  The basic laws of physics and concepts. | | | | | |
| **TEXTBOOK** | | | | Sears and Zemansky’s UNIVERSITY PHYSICS WITH MODERN PHYSICS 12TH Edition, PEARSON Addison Wesley (2008). | | | | | |
| **SUPPORTING REFERENCES** | | | | **Halliday, D. , Resnick, R., & Walker, J. (2006) 6th ed.** Fundamentals of Physics. New York: John Wiley & Sons, Inc.  **Serway, R.A. (1990). Physics for Scientists and Engineers. Philadelphia: Saunders College Publishing.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Electric Charges; Coulomb’s Law |
| 2 | The Electric Field |
| 3 | Electric Potential |
| 4 | Capacitance and Dielectrics |
| 5 | Capacitance and Dielectrics |
| 6 | Current |
| 7 | Electrical work and power |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Kirchhoffís Rules |
| 11 | Kirchhoffís Rules |
| 12 | Magnetic fields |
| 13 | Sources of the Magnetic Field |
| 14 | Faraday’s Law |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [x] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [X] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [X] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [X] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Physics II Laboratory

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| **COURSE CODE** | 151712197 | **COURSE NAME** | Physics II Laboratory |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 0 | | 0 | 2 | 1 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
| X | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | | 7 | 50 | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | General instructions; Electrolysis; Magnetic Force; Ohm’s Law; Resonance tube and stable waves; transformers | | | | | |
| **COURSE OBJECTIVE** | | | | learning the basic principles and concepts of physics | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To use existing technology and to produce new technologies. | | | | | |
| **COURSE OUTCOMES** | | | | To explain natural phenomena and analysis learn the science of physics, Understanding of scientific method and research skills. | | | | | |
| **TEXTBOOK** | | | | **M.C.Baykul, E.Alğın, S.Eroğlu, C.Aşıcı, Physics I-II Lab Manuel foe scientist and engineers,** Eskisehir Osmangazi University | | | | | |
| **SUPPORTING REFERENCES** | | | | Ekem, N. Ve Şenyel, M., **Fizik I-II Deneyleri** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | General instructions |
| 2 | Electrolysis |
| 3 | Electrolysis |
| 4 | Magnetic force |
| 5 | Magnetic force |
| 6 | Ohm’s law |
| 7 | Ohm’s law |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Transformers |
| 11 | Transformers |
| 12 | Resonance tube and stable waves |
| 13 | Resonance tube and stable waves |
| 14 | Compensated experiments |
| 15,16 | Final Exam |

|  |  |  |  |  |
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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [X] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [X] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [X] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [X] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Calculus II

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| **COURSE CODE** | 15172204 | **COURSE NAME** | Calculus II |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 4 | | 0 | 0 | 4 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Sequences and series, vector functions, functions of several variables, multiple integrals and its applications | | | | | |
| **COURSE OBJECTIVE** | | | | The main of the course is to introduce the concepts and techniques involved in the basic topics listed in this lecture and to develop skills in applying those concepts and techniques to the solution of problems | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To apply theoretical and practical knowledge on solving and modeling of engineering problems by using sufficient knowledge of engineering subjects related with mathematics | | | | | |
| **COURSE OUTCOMES** | | | | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | | | | | |
| **TEXTBOOK** | | | | Balcı, M.,2010, Genel Matematik 2, Balcı Yayınları,Ankara | | | | | |
| **SUPPORTING REFERENCES** | | | | Balcı, M.,2009, Genel Matematik Problemleri 1, Balcı Yayınları, Ankara | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Sequences and series |
| 2 | Vector functions |
| 3 | Functions of several variables, limits and continuities of them |
| 4 | Partial derivatives and chain rules |
| 5 | Derivative of implicit functions, the gradient and directional derivatives |
| 6 | Evaluating double integrals and double integral over nonrectangular regions |
| 7 | Finding volumes and areas by double integration |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Finding mass and center of gravity by double integration |
| 11 | Moments and moments of inertia of plane regions |
| 12 | Triple integrals |
| 13 | Triple integrals in cylindrical and spherical coordinates |
| 14 | Applications of triple integrals (evaluating volume, mass and moments of inertia) |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [X] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ x] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [X] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [X] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Engineering Mechanics

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| **COURSE CODE** | 15172206 | **COURSE NAME** | Engineering Mechanics |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 4 | | 0 | 0 | 4 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Fundamental concepts and definitions, vector operations, force and moment, equilibrium, friction, center of gravity, equilibrium of a rigid body, truss analysis, moments of inertia, virtual work method. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to explain defining of internal and outside forces which affects on materials at static equilibrium and calculation of their magnitudes. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This is a fundamental engineering lecture. | | | | | |
| **COURSE OUTCOMES** | | | | Do vector operations.  Calculate moment.  Write equilibrium equations.  Calculate frictional forces.  Determine center of gravity of materials.  Draw the free-body diagrams.  Define rigid body internal and outside forces.  Calculate internal and outside forces.  Calculate moments of inertia up to different reference axes.  Learn virtual work method. | | | | | |
| **TEXTBOOK** | | | | Ders notlari. | | | | | |
| **SUPPORTING REFERENCES** | | | | **Karataş, H. & Işler, Ö. (1987).** Mühendislik Mekaniğinde Statik Problemleri. Istanbul.  **Beer, F.P. & Johnston, E.R. (….).** Çeviri: Mühendisler için Mekanik Statik. Istanbul.  **ÖZBEK, T. (1985).** Mukavemet. Istanbul: ITÜ. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to statics: fundamental concepts and definitions |
| 2 | Vector operations |
| 3 | Force and moment |
| 4 | Equilibrium |
| 5 | Friction |
| 6 | Center of gravity |
| 7 | Equilibrium of a rigid body |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Truss analysis |
| 11 | Truss analysis |
| 12 | Moments of inertia |
| 13 | Calculate moments of inertia up to different reference axes |
| 14 | Virtual work method. |
| 15,16 | Practice |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [x] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Analytical Chemistry

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| **COURSE CODE** | 15172205 | **COURSE NAME** | Analytical Chemistry |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 3 | | 0 | 2 | 4 | 6 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 20 | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Chemical analysis, Qualitative and Quantitative analysis, solutions, concentrations of solutions, aqueous solution chemistry, acids and bases, reaction and equilibrium constants, solubility and solubility product, Gravimetric and volumetric analysis, | | | | | |
| **COURSE OBJECTIVE** | | | | To teach the methods of chemical analysis; gravimetric and volumetric and understanding of the related chemical reactions | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To provide handling of chemical beneficiation techniques for the mineral processing applications. | | | | | |
| **COURSE OUTCOMES** | | | | Understanding of chemical reaction involved in chemical analyses  To provide an ability of the selection and performed of appreciate analyzing method,  Calculation of the data of analysis and interpretation | | | | | |
| **TEXTBOOK** | | | | Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | Erdem B. Baykut F. , (1983) “Analitik Kimya”, Istanbul üniversitesi yayinlari No. 3134 Fatih yayinevi Istanbul,  Hamilton F., Simson G.S, Ellis D., (1969) “Calculation of Analytical Chemistry”, McGraw-Hill Book company,  **Bradey, E. J.; Russel W.J., Holum J.R, (2000) Chemistry Matter and Its Changes, John Willy &Sons, Inc** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Reactive and equipment for Lab. studies | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Principles of Chemical analysis; qualitative and quantitative analysis |
| 2 | Solutions, aqueous solution chemistry, properties of water |
| 3 | Concentration units Acids and bases I; Bronsted Lowry theory |
| 4 | Properties of solution, specific properties, electrical properties, colligative properties |
| 5 | Chemical equilibrium and reversible reactions, Le Chatelier’s principle |
| 6 | Acids and bases II; Ionization of weak electrolytes, Ionization of water, Ionization of weak monoprotic acids, Ionization of weak monoprotic bases |
| 7 | Acids and bases III; Ionization of weak polyprotic acids, Buffer solutions |
| 8 | Misterm exam |
| 9 | Midterm exam |
| 10 | Acids and bases III; Ionization of weak polyprotic acids, Buffer solutions |
| 11 | Solubility and Solubility product, influence of common ion on solubility |
| 12 | Solubility and Solubility product, influence of common ion on solubility |
| 13 | Gravimetric analysis |
| 14 | Volumetric analysis |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Turkish Language II

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| **COURSE CODE** | 151712182 | **COURSE NAME** | Turkish Language II |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 2 | | 0 | 0 | 0 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Structural Words: Word group, name, adjective, pronoun, adverb, preposition, conjunction, interjection verb, sentence, types of Written Composition, Types of Oral Composition, Speech Application, Prepared Speech Application, Text Analysis Studies. | | | | | |
| **COURSE OBJECTIVE** | | | | Informing students about the current state of development and the richness of Turkish language, bring awareness of a national language, literally to know about the subtleties about Turkish and be able to use them in their daily lives to ensure. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Provides to students speak and write Turkish correctly write in their daily lives, gain the ability to express themselves in the best way to themselves and their works in their jobs. | | | | | |
| **COURSE OUTCOMES** | | | | Define the rules of Turkish.  Define and classify the phrase in terms from structure Analyze the structure of the sentence  Create written and oral composition  Use the language correctly | | | | | |
| **TEXTBOOK** | | | | 1. Kültür, M. E., 1997, **Üniversiteler İçin Türk Dili**, Bayrak Yayınları, İstanbul. 2. Yavuz, K., Yetiş, K., Birinci, N., 1999, **Üniversite Türk Dili ve Kompozisyon Dersleri**, Bayrak Yayınları, İstanbul. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Kaplan, M., “Kültür ve Dil”, 8. baskı, ,Dergah Yayınları, İstanbul, 1993. 2. Fuat, M., “Dil Üstüne”, Adam Yayınları, İstanbul, 2001. 3. Aksan, D., “Türkçe’nin Gücü”, Bilgi Yayınevi, 4. baskı, Ankara, 1997. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | DVD, VCD, projector, computer | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Structural Words: Word group |
| 2 | Name |
| 3 | Adjective |
| 4 | Pronoun |
| 5 | Adverb |
| 6 | Preposition, Conjunction, Interjection |
| 7 | Verb |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Sentence, the sentence Components |
| 11 | Types of Written Composition |
| 12 | Types of Oral Composition |
| 13 | Prepared Speech Application, extempore Speech Application |
| 14 | Text Analysis Studies |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [x] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [X] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [X] | [ ] |
| **1**:Low Contribution 2:Medium contribution **3**:High contribution | | | | |

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# English II

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| **COURSE CODE** | 151012210 | **COURSE NAME** | English II |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 3 | | 0 | 0 | 0 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Fundamental concepts and knowledge | | | | | |
| **COURSE OBJECTIVE** | | | | This lesson is programmed to give the basic vocabulary and grammar and make the students hear, understand, speak and write in English at elementary level. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course is aimed at :  Using the basic grammar rules  The ability to use the target language in an English setting  Understanding and making dialogues  The ability to understand what’s read  The ability to communicate with English-speaking people  The ability to write in the target language | | | | | |
| **COURSE OUTCOMES** | | | | At the end of the course studends are able to :  Use the basic grammar rules  Understand and make dialogues  Read and apprehend reading materials  Communicate through writing and speaking | | | | | |
| **TEXTBOOK** | | | | 1. Essential English, Beginner Student’s Book, Richmond Publishing 2. Essential English, Workbook, Richmond Publishing | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Murphy, R., 2004, **English Grammar in Use**, Cambridge University Press, 2. **Dictionary of Contemprary English**, Longman. 3. Start Up Comprehensive English Practice**, 2007, Nüans Publishing** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Course book, workbook, CD player, loudspeakers, dictionary | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Subject Pronouns, indefinite article, a/an, *To be*, NICE TO MEET YOU |
| 2 | Verb be ( am, is, are ) I’M FINE THANKS |
| 3 | Plurals, Wh questions, this, that, these, those WHAT IS THIS IN ENGLISH ? |
| 4 | Verb be, Wh questions, Nationalities WHERE ARE YOU FROM |
| 5 | Modals: can, can’t I’M A JOURNALIST |
| 6 | Prepositions of time and place. On, in, at ALL ABOUT YOU |
| 7 | Simple present tense. Who IN PARIS ON THURSDAY |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Possessive pronouns, Possessive ‘s HOW OLD IS HE ? |
| 11 | Present Simple tense, questions, short answers HIS MUSIC, HER SHOW, THEIR CHARITIES |
| 12 | Present simple, DO YOU HAVE A BIG FAMILY ? |
| 13 | Present Simple, Wh questions MEET YOUR PERFEC PARTNER |
| 14 | Present Simple, Revision WHAT DO YOU DO AT THE WEEKEND |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [X] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Basic Computer Science

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| **COURSE CODE** | 151712200 | **COURSE NAME** | Basic Computer Science |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 2 | 2 | | 2 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | | 1 | 10 | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 10 | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Number systems and conversions, Algorithms and flowcharts, Introduction to Visual Basic, Visual Basic objects, Constants, variables and data types, Arithmetical operations and applications, Logic statements, Conditional constructs, Loop constructs | | | | | |
| **COURSE OBJECTIVE** | | | | The aim of the course is to give the logic of the basic computer programming | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | * Use number systems. * Prepare algorithm and flowchart. * Use Visual Basic objects. * Use constants, variables and data types in a VB program. * Employ If statements and Select Case structure in a VB program. * Employ For-Next and other loop constructs. | | | | | |
| **TEXTBOOK** | | | | 1. Yanik, M., “Visual Basic ile Programlama 1.Cilt: Görsel Programlama Temelleri”, Seçkin Yayincilik, Aralik 2004. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Ebubekir YAŞAR, “Algoritma ve Programlamaya Giriş”, Murathan Yayinevi, 2009. 2. Vasif Vagifoğlu NABIYEV, “Algoritmalar–Teoriden Uygulamalara”, Seçkin Yayincilik, 2007. 3. Mustafa EKER, “Algoritmayi Anlamak”, Nirvana Yayinlari, 2007. 4. Faruk ÇUBUKÇU, “Herkes için Visual Basic 6.0 Başvuru Kilavuzu”, Alp Yayinlari, Aralik 2004 5. M. HALVORSON, “Adim Adim Microsoft Visual Basic 6.0 Professional”, (Çeviri: Göksu, S., Editör: Yağci, S.), Arkadaş Yayinlari, 1998, Ankara. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show, Visual Basic Program | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction of course |
| 2 | Number systems and their uses |
| 3 | Explaining the logic of the algorithm and examples of the creation of algorithm |
| 4 | Flowchart drawings of generated algorithm examples |
| **5** | Introduction to the Visual Basic program and the objects |
| 6 | Constants, variables and data types |
| 7 | Order of operations, arithmetic operations and applications |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Comparison operators and their uses |
| 11 | Boolean operators and their uses |
| 12 | Decision structures such as If-Then and Select Case, and their applications |
| 13 | Loop structures such as For-Next, Do-Loop and While-Wend, and their applications |
| 14 | Writing code for the basic examples |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | **[ ]** | **[ ]** | **[ ]** |
| 2 | An ability to identify, formulate and solve mining engineering problems. | **[ ]** | **[ ]** | **[ ]** |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | **[ ]** | **[ ]** | **[ ]** |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | **[ ]** | **[ ]** | **[ ]** |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | **[ ]** | **[ ]** | **[ ]** |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | **[ ]** | **[ ]** | **[ ]** |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | **[X]** | **[ ]** | **[ ]** |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | **[ ]** | **[ ]** | **[ ]** |
| 9 | An understanding of professional and ethical responsibility. | **[X]** | **[ ]** | **[ ]** |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | **[X]** | **[ ]** | **[ ]** |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | **[ ]** | **[X]** | **[ ]** |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mine Development and Excavation

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| --- | --- | --- | --- |
| **COURSE CODE** | 151713228 | **COURSE NAME** | Mine Development and Excavation |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 3 | 3 | | 0 | 0 | 3 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 60 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 30 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Ore deposit reserve problem and reserve classifications. Excavation. Explosives and their use. Drilling. Drilling equipment. Horizontal haulage ways in rock. V cut methods. Blasting and loading organization. Drivage of inclined drifts in rock and ore deposits. Normal and special shaft sinking methods. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to learn excavation and sinking drift and shaft in ore deposits. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | Learn ore deposit reserve problem and reserve classifications.  Learn manual and explosive excavation, and their use.  Drilling methods and design of blasting.  Design of drifts sinking method.  Learn shaft sinking method.  Design of underground mining. | | | | | |
| **TEXTBOOK** | | | | Madenlerde Hazirlik ve Kazi Işleri, Prof.Dr. Senai SALTOĞLU, I.T.Ü. Vakfi Yayinlari | | | | | |
| **SUPPORTING REFERENCES** | | | | Çözümlü Madencilik Problemleri, Prof.Dr. Ergin ARIOĞLU, T.M.M.O.B. Maden Mühendisleri Odasi Yayini. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Ore deposit reserve problem and reserve classifications. |
| 2 | Excavation works. |
| 3 | Excavations in the explosive materials. |
| 4 | Storage of explosives. |
| 5 | Drilling of holes and drilling tools. |
| 6 | Horizontal gallery opening in the stone. |
| 7 | Inclined gallery opening in the stone. |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Drilling methods and design of blasting. |
| 11 | Gallery opening in the ore deposit. |
| 12 | Design of drifts sinking method. |
| 13 | Shaft sinking method. |
| 14 | Design of underground mining. |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Surface Mining

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| **COURSE CODE** | 151713229 | **COURSE NAME** | Surface Mining |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 3 | 3 | | 0 | 0 | 3 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Understand importance of open pit mining, design of drilling and blasting, equipments used in excavation and loading, haulage systems, marble production methods. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to present the importance of open pit mining. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | Understand importance of open pit mining, advantages and disadvantages  Design and planning of open pit mining  Design of drilling and blasting in open pit mines  Equipments selection in open pit mines  Design of haulage systems  Design of marble production methods | | | | | |
| **TEXTBOOK** | | | | KONUK, A. ve GÖKTAN, R.M., (1999), “Açik Işletme Madenciliği”, OGÜ Müh. Mim. Fak. Yayinlari, Eskişehir. | | | | | |
| **SUPPORTING REFERENCES** | | | | ***KÖSE, H., YALÇIN, E., ŞIMŞIR, F., KONAK, G., ONARGAN, T. Ve KIZIL, M.S., (2006), “Açik Işletme Tekniği”, D.E.Ü. Mühendislik Fakültesi Basim Ünitesi, Izmir.***  ***GÖKTAN, R.M., (2001), “Mermer Üretim ve Işleme Yöntemleri Ders Notlari”, OGÜ Müh. Mim. Fak Yayinlari, Eskişehir.*** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Stripping ratio, pit geometry, the general slope angle |
| 2 | Slope stability, pit regulations |
| 3 | Open pit mine design |
| 4 | Hole drilling machines |
| 5 | Fragmentation, explosives used in surface mines |
| 6 | Blasting holes design, calculate the amount of explosives |
| 7 | Excavability, Dozer-ripper machines |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Shovels, transport systems |
| 11 | Hydraulic excavators, Draglaynlar |
| 12 | Bucket Wheel Excavators, loaders |
| 13 | Marble quarry design |
| 14 | Marble open pit production methods |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [X] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mineralogy and Petrography

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| **COURSE CODE** | 151713554 | **COURSE NAME** | Mineralogy and Petrography |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 3 | 2 | | 0 | 2 | 3 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  | 30 | |
| Quiz | | |  |  | |
| Homework | | |  | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | |  | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Definition of mineral and crystal, crystal stuctures of the minerals, standard angles of the crystals, symetry and crystallography, the thirty-two crystal clsses, stereographic projection. In addition to X-ray diffraction method and its application in mineraloyg. Discription and Determination of the natual minerals based on their crystallographic properties. Also, destcribing the formation mechanism of them. Determination of the minerals based on their symetrical axes and angles. Igneous, metamorphic and sedimentary rocks will be also determined. | | | | | |
| **COURSE OBJECTIVE** | | | | Discription and Determination of the natual minerals based on their crystallographic properties. Also, destcribing the formation mechanism of them. Determination of the minerals based on their symetrical axes and angles. Igneous, metamorphic and sedimentary rocks will be also determined. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | |  | | | | | |
| **TEXTBOOK** | | | | Aslaner, M. (1995) Mineraloji I (Kristallografi), KTÜ Müh. Fak. Yayin  No: 181.  Kumbasar, I. ve Akyol, A. (1993) Mineraloji, Istanbul Teknik  Üniversitesi Kütüphanesi, Sayi; 1519, ITÜ Matbaasi,  Gümüşsuyu.  Sağirolu, G. (1984) Kristallografi, Istanbul Teknik Üniversitesi  Matbaasi, Gümüşsuyu.  Erkan, Y. (1998) Mağmatik Petrografi, Hacettepe Üniversitesi, Yayim  No. 28.  Erkan, Y. (2001) Mağmatik Petrografi, Hacettepe Üniversitesi, Yayim  No. 40.  **Petrographic lecture notes.** | | | | | |
| **SUPPORTING REFERENCES** | | | | Hurbut, C. S. (1959) Dana’s Manual of Mineralogy, John Wiley &  Sons, Inc., London.  Zoltai,T. and Stout, J. H. (1984) Mineralogy Concepts and Principles,  Burgess Publishing Company, Minneopolis, Minnesota.  Uz, B. (2000) Mineraller, Kristallografi-Mineraloji, 3. Baski,  BirsenYayinevi, Istanbul.  **Data-Show of mineral groups collected from various refferences.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Laboratory | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Theory: Definition of mineralogy and crystallography, Law of standard angle, simple and rational numeric laws (Weiss and Miller indices)  Laboratory: Application on Crystal systems |
| 2 | Theory: : Law of zones, symmetry of the crystals  Laboratory: Application on law of zones |
| 3 | Theory: Applying of stereographic projection on crystal systems.  Laboratory: Application on Crystal systems |
| 4 | Theory: X-ray diffraction (XRD) techniques, mineralogical analyses and determinations.  Laboratory: Silicates |
| 5 | Theory: Determination of chemical characteristic, isomorfism, polimorfisim, psodomorfism and isotip  Laboratory: Carbonates |
| 6 | Theory: Determination of physical properties of minerals |
| 7 | Laboratory: Suphates |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Theory: Determination of mineralogy and genesis of igneous (plutonic) rocks |
| 11 | Laboratory: Sulphate, Sülfates, Borates |
| 12 | Theory: Determination of mineralogy and genesis of igneous (volcanic) rocks |
| 13 | Theory: Determination of mineralogy and genesis of sedimentary rocks  Laboratory: Metamorphic rocks, General repeat |
| 14 | Theory: General Repeat  Laboratory: General Repeat |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# General Geology

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| **COURSE CODE** | 151713235 | **COURSE NAME** | General Geology |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 3 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
| X | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The Earth in Solar System; Minerals; Rock-Forming Minerals; Igneous, Sedimentary and Metamorphic Rocks; Geological Time; Absolute and Relative Dating; Folding and Faulting; Interior of the Earth; Earthquakes; Plate Tectonics; Mineral deposits and Energy Resources | | | | | |
| **COURSE OBJECTIVE** | | | | To infer basic knowledge of the Earth and introduce rocks and processes forming the lithosphere | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To be acquainted with Earth’s crust and enhance the knowledge in future career | | | | | |
| **COURSE OUTCOMES** | | | | 1.Acquainted with the basic knowledge about the characteristics of the Earth within the Solar System.  2.Know minerals and rock-forming minerals.  3.Identify igneous, sedimentary and metamorphic rocks.  4.Understand the principals of geological time, and absolute and relative dating.  5.Investigate the processes of soil and soil-formation.  6.Identify folds and faults.  7.Explain interior of the Earth and causes of earthquakes.  8.Investigate the concept of plate tectonics.  9.Discuss natural and energy resources. | | | | | |
| **TEXTBOOK** | | | | 1. General Geology Lecture Notes. H.Kutluk, 80 s.  2. Temel Jeoloji Prensipleri. E.Karaman ve Y.Kibici. 1999. Kocatepe Üniversitesi Yayinlari, 362 s. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Genel Jeoloji, I. Ketin, I., ITÜ Kütüphanesi, Sayi: 1096, 597 s.  **2. Physical Geology. Judson, S., Kauffman, M.E. and Leet, D.L., 1987. 7. Ed. Prentice Hall Inc., 484 s.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | N/A | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The Earth in Solar System |
| 2 | Minerals and Rock-Forming Minerals |
| 3 | Igneous Rocks |
| 4 | Sedimentary Rocks |
| 5 | Metamorphic Rocks |
| 6 | Geological Time and Absolute and Relative Dating |
| 7 | Soil and soil forming processes |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Folding and Faulting |
| 11 | Interior of the Earth |
| 12 | Earthquakes |
| 13 | Plate Tectonics |
| 14 | Natural and Energy Resources |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [X] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [x] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mechanics of Materials

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| **COURSE CODE** | 151713237 | **COURSE NAME** | Mechanics of Materials |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 3 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Normal force, shear force and moment diagrams; state of normal force affect; statically indeterminate systems; stresses occurs by thermal difference; vertical displacement; analysis of uniaxial state of stress, biaxial state of stress, transformation of plane stresses and stress state on one point; thiner rings and cylindrical tanks under internal pressure; stresses at beams, dimensioning of beams and displacement at beams. | | | | | |
| **COURSE OBJECTIVE** | | | | To teach the method of solving the problem of choosing the best material for a job by explaining determination methods of internal forces of materials under normal forces, stress analysis, stress-deformation relationships and safety factor subjects. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This is a fundamental engineering lecture. | | | | | |
| **COURSE OUTCOMES** | | | | Draw internal normal, internal shear and internal moment diagrams.  Solve normal force state problems.  Learn stress-deformation relationship.  Obtain an equilibrium equation from deformation relationship  Analysis stresses.  Determine stress tensor.  Do dimensioning of materials.  Learn safety factor.  Determine convenient material properties for a specific job. | | | | | |
| **TEXTBOOK** | | | | Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | Özbek, T. (1985). Mukavemet, Istanbul: ITÜ.  **Akgün, Ö.R. (1984). Mukavemete Giriş. Eskişehir.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Mechanics of Materials |
| 2 | Normal force, shear force and moment diagrams |
| 3 | State of normal force affect |
| 4 | Statically indeterminate systems |
| 5 | Practice |
| 6 | Uniaxial state of stress, biaxial state of stress |
| 7 | Transformation of plane stresses |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Stress state on one point |
| 11 | Deformation of materials; thiner rings and cylindrical tanks under internal pressure |
| 12 | Stresses at beams |
| 13 | Dimensioning of beams |
| 14 | Displacement at beams |
| 15,16 | Practice |

|  |  |  |  |  |
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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [x] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

**Date:**

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# History of Turkish Revolution and Principles of Kemal Atatürk I

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| **COURSE CODE** | 151011208 | **COURSE NAME** | His. of Turkish Rev. and Principles of Kemal Atatürk I |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 3 | 2 | | 0 | 0 | 2 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The Description of the term “revolution”; major historical events in the Ottoman Empire to the end of World War I; a general overview of Mustafa Kemal’s life; certain associations and their activities; arrival of Mustafa Kemal to Samsun; the congresses, gathering of the last Ottoman Assembly and the proclamation of the “national oath”; opening of the Turkish Grand National Assembly; War of independence to the Victory of Sakarya; Victory of Sakarya; financial sources of the war of independence; grand counter-attack; Armistice of Mudanya; abolution of the Sultanate; Peace Conference of Lausanne. | | | | | |
| **COURSE OBJECTIVE** | | | | To help the students to appreciate the hard conditions under which the war of independence, under the leadership of Mustafa Kemal, was fought and how an independent Turkish state was created. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To underline the idea that the national unity based on the principle “peace in the country peace in the world” can only be achieved through political, economic and military progress. | | | | | |
| **COURSE OUTCOMES** | | | | 1.Explains Principles of Atatürk and main concepts related to Revolution history.  1.1.Explians the concepts of Reform/Revolution.  1.2.Describes the concept of National Forces.  1.3.Explains the concepts of Republic/Democracy.  1.4.Recognizes the concept of Ideology.  2. Explains the main points of the period related to Turkish War of Independence and foundation of the Turkish State.  2.1.Explains the developments at Ottoman Empire before Turkish Revolution.  2.2.Describes the World War I and its results.  2.3.Explains Turkish War of Independence.  2.4.Recognizes Turkish Revolution.  2.5.Remembers the mian principles of Turkish foreign politics.  2.6.Explains Principles of Atatürk and their importance.  3.Explains the effects of the developments at Europe and World on Turkish Republic.  3.1.Explains the effects of European and World politics on Turkey and the results of them.  3.2.Describes the effects of Capitalism/Emperialism on Turkey.  3.3.Explains the relations / problems between Turkey and its neighbours.  3.4.Explains the importance of Turkey at Europe and World. | | | | | |
| **TEXTBOOK** | | | | Gazi Mustafa Kemal Atatürk, Nutuk (Söylev), C. I-II, TTK., Ank., 1986.  İmparatorluktan Ulus Devlete Türk İnkılâp Tarihi, Öztürk C. (ed.), Ank., 2011 | | | | | |
| **SUPPORTING REFERENCES** | | | | Ateş,Toktamış.(2001)Türk Devrim Tarihi.İstanbul:Der Yayınları.  Aybars,Ergün.(200)Türkiye Cumhuriyeti Tarihi.İzmir:Ercan Kitabevi. \* Eroğlu,Hamza.(1990)Türk İnkılasp Tarihi.Ankara:Savaş Yayınları.  Kongar,Emre.(1999)Devrim Tarihi ve Toplumbilim Açısından Atatürk.İstanbul.Remzi Kitabevi. \* Selek,sebahattin.(1987)Anadolu İhtilali.İstanbul:Kastaç A.Ş.Yayınları.  Şamsutdinov,A.M.(1999)Mondros'tan Lozan'aTürkiye Ulusal Kurtuluş Savaşı Tarihi (1918-1923) Çev.Ataol Behramoğlu.İstanbul:Doğan Kitapçılık.  Timur,Taner.(1997)Türk Devrimi ve Sonrası.Ankara:İmge Kitabevi. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The Balkan Wars. First World War and input to war Ottoman Empire. The fronts that Ottoman Empire fighted and the results of the war. |
| 2 | Revolution, evolution, rebellion, coup and reform. The characteristics of the Turkish Revolution. the reasons of collapse of the Ottoman Empire. |
| 3 | Mondros Armistice Agreeement and occupations on the Ottoman Empire. |
| 4 | National Independence War. The occupation of Izmir and effects of this occupation. |
| 5 | The preparation period of National Independence War |
| 6 | The movement of Mustafa Kemal to Samsun and to be started the organization of Anadolu Revolution. Amasya Circular, Erzurum and Sivas Congresses, to be founded of the Deputation. |
| 7 | Opening of the TBMM. |
| 8 | Mid-term Exam |
| 9 | Mid-term Exam |
| 10 | Rebellions against the TBMM. |
| 11 | Sevr Treaty. |
| 12 | To be founded "Kuva-yı Milliye" and national army. |
| 13 | Mudanya Armistice Agreement. Abolution of sultanate. |
| 14 | Lausanne Treaty. |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [X] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [X] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [X] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Fluid Mechanics

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| **COURSE CODE** | 151713555 | **COURSE NAME** | Fluid Mechanics |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 3 | 3 | | 0 | 0 | 3 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 4 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The description of SI unit system. Definition of fluids, type of the fluids and explanation of fluid properties. The properties of stationary fluids and solution of the problems related with these fluids. manometers, the calculation of forces on the submerged surfaces. The properties of the fluids on the motion and solution of the related problems; Bernoulli equations and venturimeter. | | | | | |
| **COURSE OBJECTIVE** | | | | To examine the properties and behavior of fluids on motion or stationary fluids. To investigate the effects of these fluids on the solid surface or interfaces with other fluids. To understand the engineering applications based on this subject and the solution of the problems. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | 1. The description of basic properties of fluids 2. The description of stationary fluids and explanation of engineering applications developed by using these properties. 3. The investigation of the properties and events of fluid flow. 4. The investigation of engineering applications related with gases and fluids in the lights of fluid mechanics.   Having the students use actively SI unit systems in the solution of all engineering problems. | | | | | |
| **COURSE OUTCOMES** | | | | Active usage of SI unit systems in the solution of all engineering problems.  The comprehension of fluids and their properties.  Be able to solve the problems related with stationary fluids and fluids on the motion | | | | | |
| **TEXTBOOK** | | | | Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Massey B. S.., “Mechanics of fluids7th Edition” 2. Young et al, “A Brief Introduction to Fluid Mechanics” 3. Nakayama &Boucher, “Introduction to Fluid Mechanics” 4. Frank M. White, “Akişkanlar Mekaniği”, Çeviren: Kadir Kirkköprü Erkan Ayder, Literatür yayincilik, 2003. 5. R.V. Giles, J.B. Evett, C. Liu; “Akişkanlar Mekaniği ve Hiidrolik”; Schaum’s Outlines; (Çev.) Yücel N., Türkoğlu H. 6. Prof.Dr. Yalçin Yüksel; “Akişkanlar Mekaniği ve Hidrolik”, Arikan Yayincilik, 2. Baski, 2005 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The description of SI unit system |
| 2 | Definition of fluids, type of the fluids and explanation of fluid properties. |
| 3 | Fluid properties. |
| 4 | Solution of the problems related with stationary fluids and Manometers |
| 5 | Stationary fluids, the calculation of forces on the submerged surfaces |
| 6 | Stationary fluids, the calculation of forces on the submerged surfaces, gate problems |
| 7 | Basic principles of fluid flow |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | The properties of fluid flow |
| 11 | Derivation of the formulas related with fluid flow |
| 12 | Bernoulli theory and its applications |
| 13 | Bernoulli theory and its applications |
| 14 | Bernoulli theory and its applications, Venturimeter |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# History of Turkish Revolution and Principles of Kemal Atatürk II

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| **COURSE CODE** | 151012209 | **COURSE NAME** | His. of Turkish Rev. and Principles of Kemal Atatürk II |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 2 | | 0 | 0 | 2 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The Description of the term “revolution”; major historical events in the Ottoman Empire to the end of World War I; a general overview of Mustafa Kemal’s life; certain associations and their activities; arrival of Mustafa Kemal to Samsun; the congresses, gathering of the last Ottoman Assembly and the proclamation of the “national oath”; opening of the Turkish Grand National Assembly; War of independence to the Victory of Sakarya; Victory of Sakarya; financial sources of the war of independence; grand counter-attack; Armistice of Mudanya; abolution of the Sultanate; Peace Conference of Lausanne. | | | | | |
| **COURSE OBJECTIVE** | | | | To help the students to appreciate the hard conditions under which the war of independence, under the leadership of Mustafa Kemal, was fought and how an independent Turkish state was created. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To underline the idea that the national unity based on the principle “peace in the country peace in the world” can only be achieved through political, economic and military progress. | | | | | |
| **COURSE OUTCOMES** | | | | At the end of this course; Students  1.Explains Principles of Atatürk and main concepts related to Revolution history.  1.1.Explians the concepts of Reform/Revolution.  1.2.Describes the concept of National Forces.  1.3.Explains the concepts of Republic/Democracy.  1.4.Recognizes the concept of Ideology.  2.Explains the main points of the period related to Turkish War of Independence and foundation of the Turkish State.  2.1.Explains the developments at Ottoman Empire before Turkish Revolution.  2.2.Describes the World War I and its results.  2.3.Explains Turkish War of Independence.  2.4.Recognizes Turkish Revolution.  2.5.Remembers the mian principles of Turkish foreign politics.  2.6.Explains Principles of Atatürk and their importance.  3.Explains the effects of the developments at Europe and World on Turkish Republic.  3.1.Explains the effects of European and World politics on Turkey and the results of them.  3.2.Describes the effects of Capitalism/Emperialism on Turkey.  3.3.Explains the relations / problems between Turkey and its neighbours.  3.4.Explains the importance of Turkey at Europe and World. | | | | | |
| **TEXTBOOK** | | | | Gazi Mustafa Kemal Atatürk, Nutuk (Söylev), C. I-II, TTK., Ank., 1986.  İmparatorluktan Ulus Devlete Türk İnkılâp Tarihi, Cemil Öztürk (ed.), Ank., 2011. | | | | | |
| **SUPPORTING REFERENCES** | | | | Niyazi Berkes, Türkiye’de Çağdaşlaşma, İstanbul, 1978.  Enver Ziya Karal, Atatürk ve Devrim (Konferanslar ve Makaleler), TTK., Ank., 1980.  Enver Ziya Karal, Atatürk’ten Düşünceler, MEB. Yay., Ankara, 1981.  Bernard Lewis, Modern Türkiye’nin Doğuşu, Çev.M.Kıratlı, TTK., Ank., 1970.  Ahmet Mumcu, Tarih Açısından Türk Devriminin Temelleri ve Gelişimi, Ank., 1976. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Mudanya Armistice Agreement. |
| 2 | Abolution of sultanate. Lausanne Treaty. |
| 3 | Declaration of Republic |
| 4 | Abolution of caliphate and lodges |
| 5 | Constitutional developments in Turkey. Internal and external political developments in the period of Atatürk's and Inönü's. |
| 6 | The political currents that effected Turkish revolution. Democratic law state. |
| 7 | The political currents that effected Turkish revolution. Democratic law state |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Establishment of the Turkish law and educational system |
| 11 | Revolution movements in education, culture and health, |
| 12 | Nationalism, Etatism and Populism. |
| 13 | Securalism, Revoluationism |
| 14 | General ecalutation. |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [X] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [X] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [X] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Differantial Equations

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| **COURSE CODE** | 151714554 | **COURSE NAME** | Differantial Equations |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | First order differential equations and application, higher order differential equations, Second order differential equations and applications, va  Variable coeffecients differential equations, initial value problems, partial differential equations, linear differential equations. | | | | | |
| **COURSE OBJECTIVE** | | | | Define, classify, evaluate and solve ODEs , To learn the all solution methods of differential equations which consist of functions with one variable.To learn the all solution methods of systems of differential equations which consist of functions with one variable. Design and conduct experiments as well as to analyze and interpret data | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course is a tool which solve the engineering problems using the differential equations. | | | | | |
| **COURSE OUTCOMES** | | | | The main aim of the course is to to improve mathematical thinking to able to solve the problems which is met in mathematics, physics and engineering | | | | | |
| **TEXTBOOK** | | | | **Richard Bronson,** Schaum’s Outlines Diferensiyel Denklemler. McGraw Hill-Nobel | | | | | |
| **SUPPORTING REFERENCES** | | | | **Ahmet Karadeniz,** Yüksek Matematik Cilt 3: Çağlayan  **Shepley, L. Ross,** Differential Equations.  **Prof. Dr. Mehmet Aydin**, Diferansiyel Denklemler ve Uygulamalari. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Classification and definition of Differential equations |
| 2 | First order differential equations |
| 3 | First order differential equations |
| 4 | First order differential equations |
| 5 | First order differential equations |
| 6 | Higher order differential equations |
| 7 | Application of second order differential equations |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Variable coefficient differential equations |
| 11 | Linear differential equations and Laplace transformation |
| 12 | Initial and boundary values |
| 13 | Partial differential equations |
| 14 | Partial differential equations |
| 15,16 | Final exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Thermodynamics

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| **COURSE CODE** | 151714555 | **COURSE NAME** | Thermodynamics |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Basic concepts of thermodynamics, Pure substance, The first law of thermodynamics for closed systems, the first law of thermodynamics for control volumes, The second law of thermodynamics, reversible and irreversible processes, Carnot cycle. | | | | | |
| **COURSE OBJECTIVE** | | | | To give students detailed knowledge of basic thermodynamic principles and their applications, heat and work, heat engines, refrigeration systems, heat pump systems, cycles, power generation systems and major components used in these systems and their analyses, and losses and efficiencies of turbines, pumps, compressors and nozzles. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | After taking up the course, the students will be capable to analyze, understand losses, calculate overall efficiencies of, heat engines, energy conversion systems, thermal power plants, refrigeration systems, heat pump systems, and follow and understand the new developments in the power plant technology area, and put their skills in practice in the field of power plant technology in industry. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Capable to know the basic concepts of Thermodynamics.  2. Recognizes the phases of pure substances, phase-change processes and property diagrams for phase-change processes.  3. Manages the use of thermodynamic property tables.  4. Applies the first law of thermodynamics to closed systems.  5. Realizes the application of the first law of thermodynamics to control volumes.  6. Able to analyse the closed and open thermodynamic systems.  7. Calculates the thermal efficiencies and coefficients of performance of heat engines, refrigerators and heat pumps.  8 Identifies the entropy change of ideal gases.  9. Evaluates the adiabatic efficiencies of turbines, compressors, pumps and nozzles. | | | | | |
| **TEXTBOOK** | | | | Yunus Ali Çengel and Michael A. Boles, “Thermodynamics: An Engineering Approach”, Seventh Edition, McGraw-Hill Book Company, 2011. | | | | | |
| **SUPPORTING REFERENCES** | | | | Claus Borgnakke and Richard E. Sonntag, “Thermodynamic and Transport Properties”, John Wiley & Sons, Inc., 1997.  Merle C. Potter and Craig W. Somerton, “Theory and Problems of Engineering Thermodynamics”, Schaum’s Outline Series, McGraw-Hill, Inc., 1993. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Engineering Thermodynamics – I. Basic Concepts of Thermodynamics. |
| 2 | Pure substance, its phases, phase change processes, property diagrams, the P-v-T surface. |
| 3 | Property tables, the ideal-gas equation of state, compressibility factor. |
| 4 | Heat, work, the first law of Thermodynamics for closed systems. |
| 5 | The internal energy, enthalpy, and specific heats of ideal gases, solids and liquids. |
| 6 | The first law of Thermodynamics for control volumes , steady-flow engineering devices. |
| 7 | Unsteady-flow processes. The second law of Thermodynamics, heat engines, refrigerators and heat pumps. |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Reversible and irreversible processes, Carnot cycle, the absolute thermodynamic temperature scale. |
| 11 | The Carnot heat engine, the Carnot refrigerator and heat pump. |
| 12 | Entropy, the increase in entropy principle, the T ds relations, the entropy change of ideal gases. |
| 13 | Minimizing the compressor work, adiabatic efficiencies of some steady-flow devices. |
| 14 | Second-law analysis of engineering systems. |
| 15,16 | FINAL EXAM |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Ore Processing I

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| **COURSE CODE** | 151714234 | **COURSE NAME** | Ore Processing I |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 3 | | 2 | 0 | 4 | 6 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to ore processing, The importance of or preparation in mining and extractive metallurgy. The importance of sampling from solid particulate material. Particle size analyses. The methods for measurements of particle size. Liberation of the valuable minerals from the gangue minerals and liberation models, determination of liberation degree, comminution, and comminution theories, crushers, mills, Screening and screens. Classification and classifiers. Hydrocyclones, tromp curves corrected tromp curves, determination of D50, | | | | | |
| **COURSE OBJECTIVE** | | | | The aim of this course is to teach all the required ore preparation treatments before determination of ore enrichment processing techniques may be applied. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To be able to determine liberation of particle size ranges of valuable mineral(s) in a given ore. To comprehend reducing a given ore in size to the pre-determined particle size ranges and preparing a proper crushing-grinding-classification scheme, determining type of crushing-grinding-classifying equipments and capacities of them | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn the position and importance of ore preparation in the mining industry. 2. Understand the importance of sampling from a given ore. 3. Comprehend the importance of reducing amount of sample in representative sampling. 4. Learn to introduce the results of particle size analyses. 5. Learn how to apply the methods of particle size analyses 6. Learn how to determine the degree of liberation. 7. Lean the bases of Comminution theories. 8. Gain the basic information about crushing and crushers. 9. Comprehend the calculation of crushing circuits. 10. Learn detailed information about grinding and grinding equipments. 11. Comprehend the calculation of grinding circuits 12. Gain detailed information about sieves and sieving. 13. Learn classification and gain detailed information about classifiers. 14. Gain detailed information about hydrocyclons. | | | | | |
| **TEXTBOOK** | | | | 1. Cevher Hazirlama I, Özdağ, H. 2002, ESOGÜ yayini. 2. Cevher Hazirlama ve Zenginleştirme, YILDIZ, N.,2010, Ertem Bas. Yay., Ankara | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Mineral Processing Technology, WILLS, B.A. 1981, Pergamon Press. 2. Introduction to Mineral Processing, KELLY, E.G., SPOTTISWOOD, D.J. 1982, John Willy&Sons 3. Cevher Hazirlamada Zenginleştirme Öncesi Işlemler, BAYRAKTAR, T.C., 1979, Istanbul Teknik Üniv. Matbaasi. 4. Principles of Mineral Dressing, GAUDIN, A.M., Tata McGraw-Hill, | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to mineral preparation, the aim of the course, giving the general information for contents of course |
| 2 | The importance of mineral preparation in the mineral processing, the importance of sampling, sampling procedures from a given ore, the reduction methods of sampling. |
| 3 | Introduction of the data of particle size analyses. Representation of the data in tables and in graphics, producing data from graphics and interpretation the obtained data. |
| 4 | Particle size measurement methods: sieve analyses, gravity sedimentation methods, centrifugal sedimentation. |
| 5 | Elutriation, electrical resistance methods, photosedimentometer, particle counting in microscope, electron microscopy. |
| 6 | Comminution and its theories; Rittinger theory, Kick theory, Bond theory. Calculation the energy in Comminution from Bond theory. Crushing and crushers; primary crushers; jaw crushers; jaw crushers, gyratory crushers. |
| 7 | Secondary crushers; Symonse cone crushers, roll crushers |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Impact crushers; thru impact crushers, hammer crushers. Calculation of crushing circuits. |
| 11 | Screening and screens. Classification. Free settling, hindered settling |
| 12 | The type of classifiers. |
| 13 | Introduction to hydrocyclones. The types of hydrocyclones. |
| 14 | D50 , finding D50 , construction tromp curves |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [x] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [x] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [x] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [x] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Topography

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| **COURSE CODE** | 151714237 | **COURSE NAME** | Topography |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 2 | | 2 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 30 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 10 | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Units of measurement and basic definitions, Basic plane geometry, Scale, Point and line marking, Length measurement. Simple land measurements, Error concept, Field calculations, Theodolite and angle measure, Introduction of coordinate systems and projection information, Basic calculations in the vertical coordinate system. Polygon, Tacheometric a lim-application, geometric and trigonometric height dimensions, dimensional drawing, three-dimensional terrain measurement, digital terrain model, the removal of sections. | | | | | |
| **COURSE OBJECTIVE** | | | | To know coordinate systems with basic terrain and map measurements. Recognition of the information on the map, calculation and drawing from the values. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Application for license application for surface and submarine mines, calculation of pickling quantities, gravity orientation and understanding of denim concepts. | | | | | |
| **COURSE OUTCOMES** | | | | Basic horizontal and vertical land to make three-dimensional measurements and calculations and make the drawing process. | | | | | |
| **TEXTBOOK** | | | | DİKER S., Ölçme Bilgisi Ders Notları | | | | | |
| **SUPPORTING REFERENCES** | | | | ŞERBETCİ M., SONGU C., GÜLAL E., Ölçme Bilgisi 1-2, Birsen Yay. İst.  KOÇ İ., Ölçme Bilgisi 1, YTÜ Yayınları, İst. 1998  KOÇ İ., Ölçme Bilgisi 2, YTÜ Yayınları, İst. 2003  ÖZBENLİ E., TÜDEŞ T., Ölçme Bilgisi, KTÜ, Trabzon, 1995 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Total station, nivo, computer, planimeter and simple measurement tools (steel strip, jalon, prism, etc.) | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Subject of measurement information, shape of the earth, measurement units, trigonometric equations, scale concept |
| 2 | Measurement of simple measuring instruments and small pieces of land |
| 3 | Triangles separation and prismatic reception method, scale change, error concept, |
| 4 | Area accounts |
| 5 | Planimeter with area, theodolite and angle measurement |
| 6 | The concept of error in the tachometer and theodolites, the coordinate system |
| 7 | Basic assignments in coordinate accounts |
| 8 | Midterm exams |
| 9 | Midterm exams |
| 10 | Polygon accounts |
| 11 | Height measure and accounts |
| 12 | Leveling routes, measurements and calculations |
| 13 | Removal of sections |
| 14 | Takeometric measurements and section sections |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [x] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [x] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [x] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Underground Mining Methods

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| **COURSE CODE** | 151714230 | **COURSE NAME** | Underground Mining Methods |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Classification underground mining methods according to different countries. Longwall methods, short face methods, methods with room and pillar , block mining methods. Effective parameters to select an underground mining method. Thick and steep seam mining, novel and innovative mining methods, stowing applications and stowing techniques for underground openings. | | | | | |
| **COURSE OBJECTIVE** | | | | Objectives of this course are to teach and introduce the underground mining methods all over the world. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Learning the types of underground mining method. Planning and designing an underground mining method for a mine deposit | | | | | |
| **COURSE OUTCOMES** | | | | * 3D geometric shapes of mine deposits * Introducing the underground mining methods and classification * Understanding and sensation underground mining methods as 3D * To evaluate the effective parameters to select underground mining methods * To design an underground mining method * Compare underground mining method each other. * To product economly mine deposits | | | | | |
| **TEXTBOOK** | | | | KÖSE, H., TATAR, Ç., Madenlerde Yeralti Üretim Yöntemleri, Dokuz Eylül Üni. Yayin No:014, Izmir, 1997. | | | | | |
| **SUPPORTING REFERENCES** | | | | * Madenlerde Yeralti Üretim Yöntemleri, Senai SALTOĞLU, ITÜ Kütp. No: 1151, 1979. * Maden Işletme Metotlari, Sadrettin ALPAN, MTA, Eğitim Serisi No:2, Ankara, 1969 * Metal Madenlerinde Yeralti Işletme Yöntemleri, Maden Müh. Odasi yayini * Maden Başçavuşlari için Maden Işletme Notlari, TKI, ZTI, Yayin No:47, 1985 * Yeralti Madenciliğinde Üretim Metotlari, Özen G., ITÜ, Yayin No: 92, 1972 * Mining Engineering Handbook, SME, ‘2nd Edition, Vol.1-2, Howard L. Hartman, Senior Editor. 1992, ABD | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, datashow | | | | | |

|  |  |
| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | To discus and decide about a subject related to mining activities |
| 2 | Researching about decided subject |
| 3 | Researching about decided subject |
| 4 | Researching about decided subject |
| 5 | Researching about decided subject |
| 6 | Evaluation the obtained information from literature research |
| 7 | Evaluation the obtained information from literature research |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Evaluation the obtained information from literature research |
| 11 | To write a report |
| 12 | To write a report |
| 13 | To write a report |
| 14 | To write a report |
| 15,16 | Giving a presentation and defending this study. |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Drilling Technique

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| **COURSE CODE** | 151714556 | **COURSE NAME** | Drilling Technique |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 1 | | 2 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Development of drilling and drilling types. Introduction of machinery and equipments of Diamond Drilling and Rotary Drilling. Useing of DCDMA and CMS drilling standards. Types, techniques, injection mixture ratios, injection additives, injection pressures, application and preparation of mixtures, ground improvement techniques of Mining Drilling, Ground (Foundation) Drilling, Injection Drilling. Cold Water Drilling and well construction processes. Drilling, screening, getting log, isolation, equipping, washing and gravelling, pump experiences on drilling of water wells... Geothermal Drillings, well deviations, rescue operations. Applications techniques of oil and natural gas drillings. Choosing of relevant drilling machineries and equipments. Area experiments on drilling wells, calculation of these experiment’s data and evaluation of results. Preparation of relevant Drilling-Injection well log, section and reports. | | | | | |
| **COURSE OBJECTIVE** | | | | Choosing and using relevant machineries and equipments at Diamond Drilling and Rotary Drilling techniques. Explaining how to make borehole drilling, screening, piping, concreting, equipping and rescuing operations. Executing relevant borehole area experiments, preparing forms and graphics and interpreting them. Preparing projects for drilling wells and execute them. Preparing all relevant Drilling-Injection log sections and reports. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Learn how to think macro and micro scale at geoscience works. Preparing project for relevant drilling well, preparing log, section, report and presenting. Planning of a drilling construction site and managing. | | | | | |
| **COURSE OUTCOMES** | | | | Using of DCDMA. CMS. API standards.  Preparing project for relevant drilling well and open that drilling well.  To make boring, piping, isolation, concreting, equipping, gravelling, pumping experiences at wells. | | | | | |
| **TEXTBOOK** | | | | Drilling Knowledge and Drilling Techniques Lecture Notes of | | | | | |
| **SUPPORTING REFERENCES** | | | | Özbayoğlu, Y., (1983). “Elmaslı Sondaj Tekniği El Kitabı”, Ankara.  Yalçın, A., Yalçın, B. “Sondaj Yöntemleri ve Uygulamaları”, TMMOB Maden Müh. Odası yanını.  Özkan, H., (2006). “Enjeksiyon Yöntemleri ve Uygulamaları”, Ankara.  Ruma, M. M. “Su Sondajı El Kitabı”, Sondajcılar Dünyası Yayınları DSİ yayın ve raporları. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show, equipping, | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to drilling (Definition, aim, importance, place in our country and around the world) |
| 2 | Diamond Drilling Machines and equipments |
| 3 | Diamond Drilling Standards (DCDMA and CMS), number of elements of an array and choosing criterias, muds and chemicals used in diamond drilling technique |
| 4 | Selection of the drill for appropriate formation and well experiments |
| 5 | Interpretation of well experiments and calculation of Lugeon values |
| 6 | Evaluation of drilling core and sediment samples and laboratory work |
| 7 | Preparation and interpretation of ground and mining drilling logs |
| 8 | Midterm Exam |
| 9 | Injection drilling, Injection types, mixture ratios, application methods |
| 10 | Calculation and application of mixture and density of injection, Preparation of injection log-section and reports |
| 11 | Rotary drilling technique, introduction of machineries and equipments of rotary dirlling, selection of drill for appropriate machinery, equipment and formation. Importance of water in our country and around the world. |
| 12 | Water drilling construction processes, tool formation calculations, isolation, equipping, gravelling, pump experience, muds and chemicals used on rotary drilling, preparation of water drilling reports |
| 13 | Water drilling construction processes, tool formation calculations, isolation, equipping, gravelling, pump experience, muds and chemicals used on rotary drilling, preparation of water drilling reports |
| 14 | Types of energies, geothermal energy, geothermal drilling, bursts of wells. Well control, well isolation and concreting processes and drilling liquids. Well completion tests. Importance, formation and searching of oil and natural gas in our country and around the world (general information) |
| 15,16 | FINAL EXAM |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [x] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [x] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [x] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Practice I

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| **COURSE CODE** | 151714557 | **COURSE NAME** | Practice I |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 0 | | 0 | 0 | 0 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | |  |  | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Summer Practise I course, which provides practical experience related to the application of theoretical knowledge in the field of mining engineering, will increase the knowledge and experience of students about mining. | | | | | |
| **COURSE OBJECTIVE** | | | | Before graduation, students gain knowledge of mining and gain practical knowledge | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | 1. Application of theoretical knowledge  2. Acquisition of Engineering Formation  3. Ability to communicate with staff  4. Identify and solve problems in place | | | | | |
| **COURSE OUTCOMES** | | | |  | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Open pit practise |
| 2 | - |
| 3 | - |
| 4 | - |
| 5 | Mineral processing practise |
| 6 | - |
| 7 | - |
| 8 | - |
| 9 | - |
| 10 | Survey practise |
| 11 | - |
| 12 | - |
| 13 | - |
| 14 | - |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | **[ ]** | **[ ]** | **[ ]** |
| 2 | An ability to identify, formulate and solve mining engineering problems. | **[ ]** | **[ ]** | **[x]** |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | **[ ]** | **[X]** | **[ ]** |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | **[ ]** | **[X]** | **[ ]** |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | **[ ]** | **[ ]** | **[ ]** |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | **[ ]** | **[ ]** | **[ ]** |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | **[ ]** | **[ ]** | **[ ]** |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | **[ ]** | **[ ]** | **[ ]** |
| 9 | An understanding of professional and ethical responsibility. | **[X]** | **[ ]** | **[ ]** |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | **[ ]** | **[ ]** | **[ ]** |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | **[ ]** | **[ ]** | **[ ]** |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Structural Geology

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| **COURSE CODE** | 151715348 | **COURSE NAME** | Structural Geology |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Teaching of geological structures on Earth Crust due to tectonic deformations | | | | | |
| **COURSE OBJECTIVE** | | | | Teaching all kinds of geological structures related with tectonic movements (faults, joints, folds, etc.); how it was formed, general characteristics, their relation with each other. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | It will contribute to students on recognizing the geological structures, understanding the evolution of the crust and thinking 3D. | | | | | |
| **COURSE OUTCOMES** | | | | There is event-effect relationship on Earth Crust. The student will gain the ability to comment on affecting crust by analyzing structures | | | | | |
| **TEXTBOOK** | | | | Ihsan Ketin, Structural Geology | | | | | |
| **SUPPORTING REFERENCES** | | | | **All kinds of books and articles related to Structural Geology** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction, Plate tectonics |
| 2 | Structural Geology and its relationship with other science. Topographic maps and cross sections. |
| 3 | Rocks behaviour. V-rule and examples |
| 4 | Strata and bedding. Strike-dipping. 3-point-rule. |
| 5 | Faults and field features. Geological cross sections. |
| 6 | Normal Fault and geological cross sections. |
| 7 | Reverse Fault and geological cross sections. |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Strike-slip Faults. Stereographic projection. |
| 11 | Joints and rose-diagram. |
| 12 | Folds and geological cross sections. |
| 13 | Plutons, and fracturing features. |
| 14 |  |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Occupational Health and Safety I

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| **COURSE CODE** | 151715349 | **COURSE NAME** | Occupational Health and Safety I |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Occupational health and safety definition, importance and basic concepts of the subject, Safety culture, OHS regulations, Hazard sources and classification, Occupational accidents, Occupational diseases, Impact on employees of the work environment, (physical, chemical, psychosocial, etc. factors), Risk analysis, Risk Assessment, Personal Protective Equipment (PPE), | | | | | |
| **COURSE OBJECTIVE** | | | | The main objective of the course is to teach prevention methods of occupational accidents and occupational diseases in the workplace. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To protect employee health and provide the safety knowing precautions against the possible accidents and occupational diseases in the workplaces | | | | | |
| **COURSE OUTCOMES** | | | | 1. Ability to interpretation the regulation on Occupational Health and Safety 2. Ability to identify hazards and risks existing in the workplace. 3. Ability to apply the concept of risk assessment 4. Ability to select the PPE | | | | | |
| **TEXTBOOK** | | | | 1. 6331 sayili ISG Kanunu 2. Özkiliç,Ö.,2014, **Risk Değerlendirmesi**, TISK Yayini, Ankara. 3. Kahya, E., 2014, **Iş Güvenliği**, ESOGÜ Yayin No :246, Eskişehir. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Yiğit, A., **Iş Güvenliği**, 2013, Dora basim-Yayin Dağitim Ltd. Şti, Bursa. 2. Bayir, M. ve Ergül, M., 2006, **Iş Güvenliği ve Risk Değerlendirme Uygulamalari**, Bursa. 3. Dizdar, E.N., 2008, **Iş Güvenliği**, 4.Baski, Murathan Yayinevi, Trabzon. 4. Esin, A., 2006, **Yeni Mevzuatin Işiğinda Iş Sağliği ve Güvenliği***,*  TMMO MMO Yayin No:MMO/363/2, Ankara. 5. 5.Demircioğlu, M., ve Kaplan, H.A., 2015, **Sorularla Iş Sağliği ve Güvenliği Hukuku,** Beta Basim Yayim Dağitim A.Ş.,Istanbul. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Description of the subject, discussion the various work accidents and showed the tutorial movies. | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The scope of the course, execution, evaluation, general information on Occupational Health and Safety |
| 2 | Safety culture |
| 3 | OHS regulations |
| 4 | OHS regulations |
| 5 | Hazard sources and classification |
| 6 | Risk analysis |
| 7 | Risk Assessment |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Impact on employees of the work environment, (physical, chemical, psychosocial, etc. factors), |
| 11 | Impact on employees of the work environment, (physical, chemical, psychosocial, etc. factors), |
| 12 | Occupational accidents (agents, type, statistics) and basic safety precautions |
| 13 | Occupational diseases |
| 14 | Personal Protective Equipment (PPE) |
| 15,16 | Final Exam |

|  |  |  |  |  |
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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [X] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Ore Processing II

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| **COURSE CODE** | 151715331 | **COURSE NAME** | Ore Processing II |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 2 | 0 | 4 | 6 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to ore processing. Mineral properties that are used in ore processing. Evaluation the enrichment results. Introducing the results as tables. Calculation recovery and lost without using % weights. Processing methods employed in processing of ores; gravity methods; heavy medium separation, basic principles of heavy medium separation, preparation heavy media, machines used. Separation minerals via stratification-jigging. Mechanisms contributing stratification, jigs used processing ores. Separation mineral in a flowing water film-shaking tables, cones, spirals- Humphrey spiral, Reinchert spirals- sluices. Construction of float and sink of coal curves. Magnetic separation and magnetic separators. Electrostatic separation. Introduction of chemical processing of ores. | | | | | |
| **COURSE OBJECTIVE** | | | | The aim of this course is to teach all the required and known ore processing methods before metallurgical treatment step. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To comprehend the importance of ore processing. To be able to determine the methods applicable to the ores. To design and to develop ore processing circuits. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn the position and importance of ore processing in the mining and metallurgical industries. 2. Understand the importance of ore processing. 3. To determine methods may be used in mineral processing. 4. To decide the more appropriate method to use for a given ore. 5. To be able to interpret the outcome of the applied ore processing method. 6. To be able to design ore processing flow-sheets. 7. To be able to develop present ore processing flow-sheets. | | | | | |
| **TEXTBOOK** | | | | 1. Cevher Hazirlama I, ÖZDAĞ, H. 2002, Eskişehir Osmangazi Üniversitesi yayini. 2. Cevher Hazirlama ve Zenginleştirme, YILDIZ, N.,2010, Ertem Basim ve Yayin Dağitim San. Ve Tic. Ltd Şti, Ankara | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Mineral Processing Technology, WILLS, B.A. 1981, Pergamon Press. 2. Introduction to Mineral Processing, KELLY, E.G., SPOTTISWOOD, D.J. 1982, John Willy&Sons 3. Cevher Zenginleştirmede Flotasyon Dişindaki Yöntemler, G. ÖNAL, T.C., 1979, Istanbul Teknik Üniv. Matbaasi. 4. 4) Principles of Mineral Dressing, GAUDIN, A.M., Tata McGraw-Hill | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to mineral separation, the aim of the course, giving the general information for contents of course, properties of minerals that may be exploited . |
| 2 | The evaluation of The results of a process. The calculation of recovery and lost of an ore processing. |
| 3 | General introduction the methods of ore processing. Sorting of mineral based on mineral optical properties. Hand sorting of minerals, Optical sorting machines. Principles of gravity separation. Concentration criterion, particle size range that can be separated according to the criterion. |
| 4 | Heavy media separation method, preparation of heavy media, properties of materials that can be used in preparing heavy media. |
| 5 | The equipment that can be used in heavy medium separation; Cone type separators; Chance cone, Wemco cone, Wemco dram. |
| 6 | Continuation of heavy medium equipment; shallow type separators, dynamic heavy medium separators; heavy medium cyclones, vorsyle heavy medium separator, Dyna Whirl Pool, Three-Flow heavy medium separator |
| 7 | Separation by stratification, jigging and jigs |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Type of jigs |
| 11 | Separation mineral in flowing film of water; shaking tables, Reinchert cones, Reinchert spirals, Humphrey spiral, Multy Gravity separator, and sluices. |
| 12 | Magnetic separation; magnetism, magnetic susceptibilities of minerals, magnetic separators. |
| 13 | Continuation of magnetic separators. |
| 14 | Electrostatic separation. Leaching of minerals. |
| 15,16 | Final Exam |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [x] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [x] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [x] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [x] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

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**Date:**

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# Technical English

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| **COURSE CODE** | 151715350 | **COURSE NAME** | Technical English |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 2 | | 0 | 0 | 0 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Gravity analysis, precipitation methods, volatilization methods, calculation of gravimetric analysis, equilibrium in reversible reactions, strong electrolytes, weak electrolytes, hydrolysis of salt solutions, solubility and solubility product. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to introduce technical words and terms enabling the students to translate the related document from English to Turkish or vice versa. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | At the end of the course students will be able to learn the meanings of technical words related to the subjects of Mineral Processing I, Mineral Processing II, and Mineral Processing III. He (She) can translate papers related to mineral processing and chemical mining too. The course enables the students to need lesser time while go through into literature. | | | | | |
| **COURSE OUTCOMES** | | | | * Increasing the accumulation of English words * Apprehending of having different meaning of English words according to the usage of them in different context. * Gaining skill of translation of English texts to Turkish | | | | | |
| **TEXTBOOK** | | | | I.M. KOLTHOFF; E.B. SANDELL; Textbook of Quantitative Inorganic Analysis, The Macmillan Company 1943 | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The important of Technical English in mineral processing and striking examples. |
| 2 | Quantitative Analytical |
| 3 | Gravimetric Analytical techniques |
| 4 | Precipitation Methods |
| 5 | Precipitation Methods |
| 6 | Precipitation Methods |
| 7 | Volatilisaton Methods |
| 8 | Volatilisaton Methods –Direct Methods |
| 9 | Volatilisaton Methods –Indirect Methods |
| 10 | Equilibrium in the reversible reactions |
| 11 | Electrolytes |
| 12 | Mid Term Examination |
| 13 | Dissociation of weak electrolytes |
| 14 | Hydrolysis of salt solutions |
| 15,16 |  |

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| **NO** | **PROGRAM ÇIKTISI** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [x] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [X] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| 1:Low Contribution 2:Medium contribution 3:High contribution | | | | |

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# Rock Mechanics

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| **COURSE CODE** | 151715344 | **COURSE NAME** | Rock Mechanics |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 5 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Definitions and terms in rock mechanics; engineering properties of rock mass discontinuities; laboratory tests, geomechanical classification of rocks; field stresses; rock yielding criteria; distribution of stresses and deformations around underground openings; numerical modeling analysis and subsidence. | | | | | |
| **COURSE OBJECTIVE** | | | | To explain the determination methods of geo-mechanical rock properties and to give capability of describing rock behavior before, during and after technical interference under different natural conditions. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Learn the determination methods of geo-mechanical rock properties and have capability of describing rock behavior before, during and after technical interference under different natural conditions. | | | | | |
| **COURSE OUTCOMES** | | | | Learn intact rock and rock mass terms.  Understand the laboratory test methods.  Learn the laboratory test equipments.  Learn the stress-deformation relationship.  Learn the determining methods of discontinuity properties.  Learn the geomechanical classification of rocks.  Learn the measurement methods of field stresses.  Determine in situ stress components.  Learn the stress redistribution around the underground mining openings.  Learn the rock yielding criterions.  Use Phase2 Finite Element Geotechnical Modelling software.  Learn subsidence calculations.and the methods to prevent subsidence. | | | | | |
| **TEXTBOOK** | | | | Course notes. | | | | | |
| **SUPPORTING REFERENCES** | | | | Önce, G. (1999). Madencilikte Kaya Mekaniği. Eskişehir: OGÜ.  Hoek, E. (2000). Practical Rock Engineering. Web sitesi. ROCSCIENCE.  Ulusay, R. & Sönmez, H. (2002). Kaya Kütlelerinin Mühendislik Özellikleri. Ankara: TMMOB. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Bilgisayar, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Definitions and terms in rock mechanics |
| 2 | Intact rock properties |
| 3 | Laboratory practice |
| 4 | Discontinuity properties |
| 5 | Core properties and bore logs |
| 6 | Geo-mechanical classification of rocks |
| 7 | Rock failure criteria |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Field stresses |
| 11 | In-situ stresses |
| 12 | Secondary stresses |
| 13 | Numerical analysis in rock mechanics |
| 14 | Subsidence of ground |
| 15,16 | Practice |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [X] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [x] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Probability and Statistics

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| **COURSE CODE** | 151715343 | **COURSE NAME** | Probability and Statistics |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 30 | |
| Quiz | | | 1 | 15 | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 45 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Describing the data; types of descriptive methods, classification of variables, frequency distributions, histograms, measures of central tendency (arithmetic mean, median, mode, measures of dispersion ( range, variance and standard deviation, Normal distribution, log-Normal distribution, estimation, hypothesis testing (student probability distribution, chi-square distribution), regressions | | | | | |
| **COURSE OBJECTIVE** | | | | Fundamentals of statistics, collection and analyses of date, selection of appropriate method/s or make an improvement on the existing statistical design- evaluation techniques. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To provide the understanding of statistical techniques for the mining engineering applications. | | | | | |
| **COURSE OUTCOMES** | | | | Understanding of the statistical procedure and the role of the statistic in mineral or mining Industry,  Information about date collection and data processing,  Utilization of statistical techniques to make a decision or modeling | | | | | |
| **TEXTBOOK** | | | | Konuk A., Önder S.. (1989), “ Maden Istatistiği” OGÜ-Eskişehir | | | | | |
| **SUPPORTING REFERENCES** | | | | * Püskülcü H., Ikiz F., 1989, “Istatistiğe Giriş” Bilgehan Basim evi, Izmir * Carlson L.W., Thorne B., 1997, “Applied statistical methods”, Prentice Hall * Newbold P., 2000, “Işletme ve Iktisat için Istatistik” Literatür Yayincilik- | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to statistic |
| 2 | Data Describing; types of descriptive methods, classification of variables, measures of central tendency (arithmetic mean, median, mode) |
| 3 | Measures of dispersion range, variance and standard deviation) |
| 4 | Normal distribution |
| 5 | Log Normal distribution, introduction to estimation |
| 6 | Midterm Exam |
| 7 | Hypothesis testing (Standard probability distribution), |
| 8 | Hypothesis testing (Student probability distribution), |
| 9 | Hypothesis testing (distribution) |
| 10 | chi-square testing |
| 11 | Regression and correlation |
| 12 | Simple least –square regression , Uses of linear regression, least square coefficient estimation |
| 13 | Correlation analyses |
| 14 | Multiple regression |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [x] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution 3:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Rock Slope Stability

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| **COURSE CODE** | 151715345 | **COURSE NAME** | Rock Slope Stability |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Economy and planning; fundamental mechanics of slope failure; graphical projection of geological data; rock strength properties; plane failure; wedge failure; circular failure; stabilization of rock slopes. | | | | | |
| **COURSE OBJECTIVE** | | | | The main purpose of the course is to teach the various calculation methods related with rock slope stability and the applied techniques for stabilizing the slopes, and to introduce different softwares used for analyzing slopes. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course will make occupational contribution to the evaluation of stability analyses of rock slopes in surface mining operations. | | | | | |
| **COURSE OUTCOMES** | | | | By the end of this course, students will be able to:  1.Comprehend the basic principles of rock slope design.  2.Interpret the geological data by drawing stereographic projections.  3.Calculate the factor of safety for different type of failure.  4.Design the slopes in an open pit considering the factor of safety and economy.  5.Select the most suitable stabilization method for slopes which is probable to failure.  6.Use the graphics designed for determining the factor of safety for any type of failure.  7.Use the softwares designed for slope stability analyses. | | | | | |
| **TEXTBOOK** | | | | Hoek, E., Bray, J.W. (1991). (Çevirenler: Paşamehmetoğlu, A.G., Özgenoğlu, A., Karpuz, C.) Kaya Şev Stabilitesi. TMMOB Mden Mühendisleri Odasi. Ankara: Kozan | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Ulusay, R. (1982). Şev Stabilite Analizlerinde Kullanilan Pratik Yöntemler ve Jeoteknik çalişmalar. Ankara: MTA  2. Duncan, C., Wyllie, C.W. (2004). Rock Slope Engineering: Civil And Mining. New York: Spon.  3. http://www.rockware.com/ | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

|  |  |
| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Economy and planning |
| 2 | Fundamental mechanics of slope failure |
| 3 | Graphical projection of geological data |
| 4 | Graphical projection of geological data |
| 5 | Rock strength properties |
| 6 | Plane failure |
| 7 | Plane failure |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Wedge failure |
| 11 | Wedge failure |
| 12 | Circular failure |
| 13 | Circular failure |
| 14 | Stabilization of rock slopes |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Blasting and Environmental Impacts

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| **COURSE CODE** | 151715346 | **COURSE NAME** | Blasting and Environmental Impacts |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The content of the course is as follows: The importance of drilling and blasting, the definition and properties of explosives, the ignition systems and components, mechanical fragmentation of rock structures, surface blasting and the elements, bench blasting, trenching, tunnel blasting, description and theory of the blast-induced environmental problems, application-based presentation of a widely used seismograph; measuring and estimation techniques of vibrations, the relevant legislation and standards. | | | | | |
| **COURSE OBJECTIVE** | | | | The aim of this course is to teach the designing of blasting operations in mining considering economic efficiency and safety accordance with science and technical. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Blasting should be designed by considering the economic efficiency and safety accordance with science and technical. In this course, about blasting techniques and applications in open pit mines, underground mines, tunnel, channel etc. given technical information. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn explosives, the ignition systems and components 2. Learn mechanical fragmentation of rock with explosives 3. Learn techniques of bench blasting, trenching, tunnel blasting 4. Recognize the blast-induced environmental problems 5. Use a device practically for measuring the blast-induced vibrations 6. Learn techniques of estimation and measurement of the ground vibrations. 7. Learn the safety and security in blasting | | | | | |
| **TEXTBOOK** | | | | Erkoç Ö.M, Kaya Patlatma Tekniği, 1990. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Bilgin HA. Maden Mühendisliği Açik Ocak Işletmeciliği El Kitabi. TMMOB Maden Mühendisleri Odasi. Vol 5. p231-314. 2005. 2. Alpaydin E. ve Arkadaşlari. Patlayici Maddeler ve Patlatma Teknikleri. Nitromak Eğitim Yayinlari. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The Importance of Drilling and Blasting |
| 2 | Definition and Characteristics of Explosives |
| 3 | Explosive Products and Ignition Systems |
| 4 | Ignition systems and components |
| 5 | Rock Structures in Blasting Technique, Theory of Fracture of Rocks |
| 6 | Surface Blasting and Components |
| 7 | Bench Blasting |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Trenching Blasting |
| 11 | Specific Blasting Applications |
| 12 | Tunnel Blasting |
| 13 | Measurement and Control of Blast Induced Ground Vibrations |
| 14 | The Safety and Security in Blasting |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [X] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

**Date:**

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# Mine Exploration and Valuation

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| **COURSE CODE** | 151715347 | **COURSE NAME** | Mine Exploration and Valuation |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 25 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | | 1 | 15 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Definition of mine exploration and valuation. Definition of mineral deposits. Mineral resources classification. Sampling theory and application to mineral deposits. Mineral sampling methods. Mineral exploration methods. Geophysical methods. Parameters of reserve estimation. Reserve Classification. Methods of reserve estimation. Computations of reserve estimation. | | | | | |
| **COURSE OBJECTIVE** | | | | 1. Discovery methods of mineral deposits 2. Engineering design of mineral deposits. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | A geologic discovery of a mine deposit and it is ready for production in an operating mine. | | | | | |
| **COURSE OUTCOMES** | | | | Learn the mine exploration methods  Assessment of mine deposits  Calculate the reserve. | | | | | |
| **TEXTBOOK** | | | | Çelebi, N. (1990). Mine valuation, Ankara | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Güneş, C. (1983). Kaynak ve rezerve siniflamasi. Ankara. 2. Bumin, M. (2003) Madencilikte rezerve hesaplama yöntemleri. Ankara 3. (2005) Maden Mühendisliği Açik Ocak Işletmeciliği El Kitabi, Ankara 4. Eskikaya, Ş., Karpuz, C., Hindistan, M. A. Ve Tamzok, N. (eds), (2005) Maden Mühendisliği Açik Ocak Işletmeciliği El Kitabi, Ankara. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Basic definitions and concepts |
| 2 | The methods of exploration of mine deposits |
| 3 | Sampling |
| 4 | Reserve estimation methods |
| 5 | Parameters of reserve estimation |
| 6 | Cross-Section methods |
| 7 | Standard method |
| 8 | Lineer Method |
| 9 | Analytical methods |
| 10 | Average factor and area method |
| 11 | Geostatistical methods |
| 12 | Midterm |
| 13 | Revenue and cost concepts |
| 14 | Mine valuation |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

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**Date:**

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# Tunnelling Technology

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| **COURSE CODE** | 151715351 | **COURSE NAME** | Tunnelling Technology |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | | 1 | 50 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | A brief introduction to tunneling, tunnel types excavated in different ground conditions and NATM method | | | | | |
| **COURSE OBJECTIVE** | | | | Basic purpose of this course is to increase the knowledge of the students about tunneling technology and NATM method | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The development of ability to use in professional work by learning different tunnel types and various tunneling methods | | | | | |
| **COURSE OUTCOMES** | | | | 1. Understanding of basic principles of Tunneling Technology 2. Understanding tunnel types 3. Understanding planning and geotechnical investigation concepts 4. Gaining general knowledge about Cut and Cover, Rock tunnels 5. Gaining general knowledge about soft and Difficult Ground Tunneling 6. Gaining detailed knowledge about NATM method | | | | | |
| **TEXTBOOK** | | | | Course Notes | | | | | |
| **SUPPORTING REFERENCES** | | | | Technical Manual for Design and Construction of Road Tunnels, FHWA 2009 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction and General Tunneling Terms |
| 2 | Planning |
| 3 | Geotechnical Investigation |
| 4 | Cut and Cover Tunnels |
| 5 | Rock Tunneling |
| 6 | Rock Tunneling |
| 7 | Soft Ground Tunneling |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Soft Ground Tunneling |
| 11 | Difficult Ground Tunneling |
| 12 | Difficult Ground Tunneling |
| 13 | Sequential Excavation Method (NATM) |
| 14 | Sequential Excavation Method (NATM) |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [X] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Geological Mapping

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| **COURSE CODE** | 151715352 | **COURSE NAME** | Geological Mapping |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 20 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | | 1 | 30 | |
| Others (………) | | | 1 | 20 | |
| **FINAL EXAM** | | | |  | | | 1 | 30 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Fundemental geological mapping knowledge and interpretation of geological evolution. Recognising and grouping rock units in the field, and drawing their boundaries on the map. Drawing structural elements on the map and to prepare reports including all field findings. | | | | | |
| **COURSE OBJECTIVE** | | | | To provide ability of doing geological observations alone and to note them systematically on the field notebook. To prepate a geological map alone and use it for a specific geological problem. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To practice the previous theoretical or lab courses (such as stratigraphy, sedimentology, structural geology etc.) and to formulate geological problems for their solution, and prepare geological reports. | | | | | |
| **COURSE OUTCOMES** | | | | To gain attitude of finely localisation himself in the field and on topographic map; lithologic description, recognition of bedding and measuring its position; recognision of faults and fissures, and their measurements; grouping the lithologies and mapping them; to put forward interpretation of a mapped field in terms of geological evolution and preparing geological reports including all types of field data. | | | | | |
| **TEXTBOOK** | | | | Jeolojik Harita Alimina Giriş (Seyitoğlu, 2013) | | | | | |
| **SUPPORTING REFERENCES** | | | | Jeolojik Harita Bilgisi (Tatar, 1995)  Geological maps: an introduction (Maltman, 1998),  Temel Jeolojik Harita Bilgisi ve Uygulamalari (Karaman, 1987) | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | compass, magnifier, hammer, measure, GPS instrument | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Map concept, map types |
| 2 | Geological maps, coverage, aims and history |
| 3 | Topographic base maps: projection systems, grid system |
| 4 | Direction, dip, thickness and depth in geological maps |
| 5 | Measurements in 3 dimentions: Strike, dip, thickness, depth. |
| 6 | Producing structure contours and their interpretation |
| 7 | Unconformities in geological maps: conceptual frame and examples |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Faults in geological maps: conceptual frame and examples |
| 11 | Folds in geological maps: conceptual frame and examples |
| 12 | Field practises with the partial guidance of research asistants. |
| 13 | Field practises with the partial guidance of research asistants. |
| 14 | Prepare a report by using field data. |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [x] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [x] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [x] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [x] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Metallic Ores and Beneficiation

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| **COURSE CODE** | 151715353 | **COURSE NAME** | Metallic Ores and Beneficiation |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 30 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Properties of metallic ores, concentrate on the required properties, metallic ore beneficiation methods and promotion of existing enrichment plant. | | | | | |
| **COURSE OBJECTIVE** | | | | In this course, it is aimed to inform the students about to recognition of minerals including metallic ores, the importance of this matter and come to grasp, learning about applied enrichment methods and the issues to be considered in to selection of processing methods and the required concentrate properties and the existing enrichment plant. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To recognize the various metallic ore minerals, to understand the basis of the enrichment process, to understanding plant flowsheet related to the beneficiation method of metallic ores, to learn about physical, physico-chemical and chemical processing. | | | | | |
| **COURSE OUTCOMES** | | | | 1. To recognize the ores containing metal. 2. To understand the basis of metallic ore beneficiation methods. 3. Understanding flowsheets of the metal ore processing plant. 4. To develop information on the physical, physico-chemical and chemical processing. 5. To perform the analytical thinking and basic engineering calculations 6. To improve the flow sheet and conceptual process for evaluating the metallic ores 7. Environmental, social and economic point of view, to evaluate, to understand and analyze.a variety of mineral processing and hydrometallurgical processes | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | Books, journals, theses, web databases, etc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Basic mineralization involving metal and enrichment processes. |
| 2 | Major iron minerals, chemical, physical and mineralogical characteristics; properties on iron concentrate, according to physical, magnetic and surface features the beneficiation of iron ores. |
| 3 | The main copper minerals, chemical, physical and mineralogical characteristics; properties on copper concentrate; the beneficiation of copper ore. |
| 4 | The main lead and zinc minerals, physical, chemical and mineralogical properties; properties on Pb-Zn concentrate; the beneficiation of Pb-Zn ore |
| 5 | The hydrometallurgical and the pyrometallurgical processes on copper, lead and zinc mineral processing |
| 6 | The ore used in aluminum production, its features and beneficiation |
| 7 | The minerals including chrome and its features, the methods used for the enrichment of chromite ore |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | The major antimony, mercury and arsenic ores, the required properties on the concentrates and beneficiation methods |
| 11 | The major nickel minerals, chemical, physical and mineralogical characteristics; beneficiation methods and hydrometallurgy process |
| 12 | The manganese ore and the beneficiation; The applied methods on other certain metals (Co,Bi,Cd, Mo,Sn) |
| 13 | The beneficiation methods applied to precious metals like gold and silver |
| 14 | The environmental and social effects of the enrichment process |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [X] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution 3:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Total Quality Management in Mining

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| **COURSE CODE** | 151715354 | **COURSE NAME** | Total Quality Management in Mining |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 5 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | |  | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | In mining applications; evaluation of quality concept, quality control and quality management processes | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to be able to evaluate quality improvement processes in mining applications including open pits and quarries (excavation, blasting etc.), underground operations, ore preparation and enrichment applications. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | At the end of the course students will be able to gain the ability to comprehend and apply the principles of quality management in relation to mining activities | | | | | |
| **COURSE OUTCOMES** | | | | Increasing the accumulation of English words  Apprehending of having different meaning of English words according to the usage of them in different context.  Gaining skill of translation of English texts to Turkish | | | | | |
| **TEXTBOOK** | | | | Statistical Quality Control, 6.th Edition, Douglas C. Montgomery | | | | | |
| **SUPPORTING REFERENCES** | | | | İstatistiksel Kalite Kontrol, Prof. Dr. Şanslı Şenol, A.Ü.F.F. Döner Sermaye İşletmesi Yayınları, Yayın No: 62. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Quality Definition, History, Basic Concepts, Quality & Statistics, Quality Control & Inspection, Statistical Quality Control. Importance of quality in mining. |
| 2 | Total Quality Control, Total Quality Management, Basic Statistical Methods (7 Quality Tools), Quality Planning, Quality Assurance & Quality Development, Quality Engineering, |
| 3 | The Relationship Between Basic Statistical Probability Distributions in Quality Control, Statistical Process Control Application Examples, Relationship between Control Cards and Hypothesis Testing |
| 4 | Continue to Control Charts for Variables, X-mean. And R Control Card Applications, |
| 5 | Attendance to Control Charts for Variables, Sample Variance 𝑠2 Control Chart, Moving Range Control Chart and Units Control Chart, |
| 6 | Control Charts According to Qualifications (Symptoms) |
| 7 | Other Quality Improvement / Improvement Techniques: FMEA (Failure Mode Effect Analysis), QFD (Quality Function Deployment, Quality House). |
| 8 | Mid-Term Examination, Process Proficiency Analysis (Variable and Qualification), |
| 9 | Mid-Term Examination, Process Proficiency Analysis (Variable and Qualification), |
| 10 | Alternative Control Charts for Classical Control Graphics: |
| 11 | Full Factorial Experimental Design (DOE), Fractional Factorial and Taguchi Experimental Design Method |
| 12 | Acceptance Sampling Techniques for Qualifications, |
| 13 | Mining Applications (Open pit, Quarry, Marble Quarry and Factory) |
| 14 | Mining Applications (Underground Mining) (Mineral Processing Plants) |
| 15,16 | FINAL EXAM |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [X] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [X] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

**Date:**

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# Ore Deposits

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| **COURSE CODE** | 151716330 | **COURSE NAME** | Ore Deposits |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Classification of ore deposits, morphologies of ore bodies and relations with their wall rocks, structures and textures of ores, endogenic deposits, exogenic deposits | | | | | |
| **COURSE OBJECTIVE** | | | | To teach to students the formation of ore deposits and formation environments, the relations of ore-wall rocks, the structures and textures of ores. To enroll students with projects on ore deposits. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To enhance students’ knowledge of handling and participating ore-deposit projects in the institutions or companies they will be working for. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Comprehension processes of ore formation, 2. Understanding of all aspects of the interaction of wall rock mineralization, 3. To use theoretical knowledge in the field | | | | | |
| **TEXTBOOK** | | | | Endogenic Ore Deposits, Prof. Dr. Altan GÜMÜŞ  Bilim Ofset, 1998, Bornova- İzmir (In Turkish)  Exogenic Ore Deposits, Prof. Dr. Altan GÜMÜŞ  D.E.Ü. Press unit, 1999, Bornova- İzmir (In Turkish) | | | | | |
| **SUPPORTING REFERENCES** | | | | Ore Deposits, Prof. Dr. Ahmet GÖKÇE  Cumhuriyet Un. Publ. No: 85, 2000, Sivas (In Turkish)  Ore Deposits, Formation and Evaluations,  Prof. Dr. Önder ÖZTUNALI, Latin Press, 1973, İstanbul (In Turkish)  Ore Deposits and Plate Tectonic, Prof. Dr. F.J. Sawkins,  Ankara Un. Publ., 1999, Ankara (In Turkish) | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | History of minning, terms of ore mineralization, classification of ore deposits |
| 2 | Morphologies of ore bodies, relations with their wall rocks, endogenic deposits |
| 3 | Orthomagmatic deposits |
| 4 | Porphyric deposits |
| 5 | Pegmatitic and pneumatolytic deposits |
| 6 | Pyrometasomatic deposits, hydrothermal deposits |
| 7 | Volcanic and subvolcanic deposits |
| 8 | Metamorphic deposits |
| 9 | Mid Term Exam |
| 10 | Exogenic deposits and residual deposits |
| 11 | Oxidation and cementation deposits |
| 12 | Placer deposits and stratiform deposits |
| 13 | Chemical and biochemical sedimentary Fe-Mn deposits |
| 14 | Pb-Zn cover deposits |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mineral Processing III

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| **COURSE CODE** | 151716332 | **COURSE NAME** | Mineral Processing III |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 2 | 0 | 4 | 6 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Flotation rules, Flotation reagents, Flotation Test Methods, Flotation Machines, Flotation Types, Flotation Plant Applications, Cu Sulphide Ores, Pb-Zn Sulphide and Oxide Ores, Pb-Zn-Cu-Fe Ores, Au-Ag Ores, Non-Metallic Ores, Komplex Ores Flotation Practices and Flotation Problems. | | | | | |
| **COURSE OBJECTIVE** | | | | Identifying froth flotation and its properties, classification of flotation reagents and flotation machines, learning about flotation test methods and flotation flowsheets, grasping flotation of sulhide and non-sulphide mineral flowsheets in lab and plant scales are some of the main aims of this course. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Flotation is a compulsory course for Mining Engineering education in the world. For the professional training point of view, learning the theory and plant applications of the most widely used mineral separation process is very important. | | | | | |
| **COURSE OUTCOMES** | | | | 1 .Learning the theory of flotation and flotation machines.  2. Classifying flotation test methods and flotation machines  3. Identifying flotation types and variables effects on flotation.  4. Learing about flotation plant practices.  5. Learning sulphide and non-sulphide ores flotation flowsheets.  6. Seeing Pb-Zn sulphide/oxide ores flotation flowsheets.  7. Learning precious and non-metallic ores flotation  8. Feldspar, flourite, chromite, barite ores flotation.  9. Quartz, iron ore, coal and magnesite flotation flowsheets.  10 Naturally hydrophobic minerals flotation principles..  11. Complex ores flotation flowsheets.  12. Problems related to flotation. | | | | | |
| **TEXTBOOK** | | | | Kaya M. (2000), Flotasyon El Kitabi I | | | | | |
| **SUPPORTING REFERENCES** | | | | S. Atak (1984), Flotasyon Ilkeleri ve Uygulamasi, ITÜ, Istanbul.  B.A. Wills, (1988), Mineral Processing Technology, Pergamon Press.   |  | | --- | |  | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Flotation rules and theories |
| 2 | Flotation reagents |
| 3 | Flotation test methods and types |
| 4 | Flotation machines |
| 5 | Flotation flowsheets |
| 6 | Flotation plant applications |
| 7 | Cu sulphide and oxide ores flotation |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Pb-Zn ores flotation |
| 11 | Non metallic ores flotation |
| 12 | Naturally hydrophobic ores flotation |
| 13 | Complex ores flotation |
| 14 | Problem solution |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [x] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Transportation and Water Drainage in Mines

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| **COURSE CODE** | 151716334 | **COURSE NAME** | Transportation and Water Drainage in Mines |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Subsystems of transportation in mines, Transportation via gravity, Swinging Conveyor, Chain Conveyors, Belt Conveyors, Railway Transportation, Transportation by Locomotives, LHD, Transportation by Ropeway, Transportation of Pipelines, Personnel Transportation in Underground Mines, Water drainage in Mines | | | | | |
| **COURSE OBJECTIVE** | | | | To introduce transportation equipments used in mines for ore, personnel and material transportation, To teach the transportation system calculations, To explain water drainage problem, To teach the water drainage calculations | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The students can choose suitable transportation system according to the applied production method and operation condition, and perform related calculation | | | | | |
| **COURSE OUTCOMES** | | | | Introduce transportation equipments used in mines for ore transportation.  Introduce transportation equipments used in mines for material transportation.  Introduce transportation equipments used in mines for personnel transportation.  Ability to select optimum transportation system.  Ability to perform the transportation system calculations.  Comprehend water drainage problem.  Ability to perform the water drainage calculations. | | | | | |
| **TEXTBOOK** | | | | Önce, G., (1992). “Madenlerde Ulaşim ve Su Atimi”, Eskişehir Osmangazi Üniversitesi Mühendislik-Mimarlik Fakültesi Yayinlari. | | | | | |
| **SUPPORTING REFERENCES** | | | | Şimşir, F., Tatar, Ç. ve Özfirat, K., (2002). “Madenlerde Nakliyat”, 9 Eylül Üniversitesi Mühendislik Fakültesi Yayinlari, No: 296, Izmir.  Erdem, Bülent, “Nakliyat ve Su Atimi”, Cumhuriyet Üniversitesi Maden Mühendisliği Bölümü, Yayimlanmamiş Ders Notlari.  Uğur, Ismail, “Madenlerde Ulaşim ve Su Atimi”, Istanbul Teknik Üniversitesi, Yayimlanmamiş Ders Notlari. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Subsystems of transportation in mines, The factors affecting selection of transportation systems in mines, Personnel Transportation in Underground Mines |
| 2 | Transportation via gravity, Stationery Chute, Spiral Chute, Stopes |
| 3 | Swinging Conveyor, Introduction to Chain Conveyors |
| 4 | Chain Conveyors, |
| 5 | Introduction to Belt Conveyors |
| 6 | Belt Conveyors |
| 7 | Midterm Exam |
| 8 | Midterm Exam |
| 9 | Railway Transportation |
| 10 | Transportation by Locomotives |
| 11 | LHD |
| 12 | Transportation by Ropeway, Transportation by Pipeline, |
| 13 | Introduction to Water Drainage in Mines |
| 14 | Arrangement of water drainage plant, Water drainage methods, Water drainage calculations |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Computer Aided Mineral Processing Design

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| **COURSE CODE** | 151716350 | **COURSE NAME** | Computer Aided Mineral Processing Design |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 1 | | 2 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | | It will be useful to achieve Mineral Processing I and II lessons and It would be better to take this lesson with Mineral Processing III lesson. | | | | | |
| **SHORT COURSE CONTENT** | | | | Terminology in Mineral Processing, Measurement units, general comminution processes, Ore dressing processes and devices, selection and dimensioning of devices, metallurgical balance calculations, computers softwares used in plant and flowsheet designs and their applications. | | | | | |
| **COURSE OBJECTIVE** | | | | The main objective of the course is to teach usage of computer softwares in design of mineral processing plants and flowsheets, material balance, optimization, role of softwares in general mineral processing plant control, main principles and have knowledge about their general usage. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To get the importance of computers anf softwares in design of mineral processing units and plants and have knowledge their usages and get the mechanisms and behaviour of ore dressing and mineral processing by modelling and simulation studies. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Ability to get the importance and stages of ore dressing and mineral processing design  2 Learning the role of computers in design of ore dressing and mineral processing  3. Ability to have more detailed knowledge about the material balance calculatios in basic and complex proces circuits and to apply them.  4. Ability to have more detailed knowledge about selection of flowsheet and devices in basic and complex process circuits in plants and to apply them.  5. Ability to get more about the mechanisms and behaviour of ore dressing and mineral processing plants by making design studies. Ability to solve the problems in this field that would be come to accross in the future. | | | | | |
| **TEXTBOOK** | | | | 1. Lecture notes, Modeling and Simulation of Mineral Processing Systems (Yazar: Ronald Peter King), 2. Mineral Processing Design and Operations, Second Edition: An Introduction 2nd Edition (Yazar:[Ashok Gupta](http://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Ashok+Gupta&search-alias=books&field-author=Ashok+Gupta&sort=relevancerank),[Denis S. Yan](http://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&text=Denis+S.+Yan&search-alias=books&field-author=Denis+S.+Yan&sort=relevancerank)) | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Educational Computer Softwares | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction and terminology |
| 2 | Pre-studies on modelling in mineral processing plant design |
| 3 | Material balance (For plant design, optimization, metallurgical calculations and general data analysis) |
| 4 | Units in mineral processing plants and devices used in the units |
| 5 | Mathematical formulas used in mineral processing scopes (models) |
| 6 | Mathematical formulas (models), measurement units used and conversion |
| 7 | Softwares used in mineral processing, general information about JKSimMet, JKSimFloat, JKMultiBal,USIM PAC, MetSMART, MODSIMTM |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Practice in metallurgical material balance by related sotware (design) |
| 11 | Practice in crushing and grinding by related sotware (design) |
| 12 | Practice in crushing, grinding and classification by related sotware (design) |
| 13 | Practice in physical enrichment by related sotware (design) |
| 14 | Practice in flotation by related sotware (design) |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Matematik, fen bilimleri ve Maden Mühendisliği konularında yeterli bilgi birikimi; bu alanlardaki kuramsal ve Practicelı bilgileri Maden Mühendisliği problemlerini modelleme ve çözme için uygulayabilme becerisi | [X] | [ ] | [ ] |
| 2 | Maden Mühendisliği ve ilgili alanlarda karmaşık mühendislik problemlerini saptama, tanımlama, formüle etme ve uygun analiz ve modelleme yöntemlerini seçip uygulayarak çözme becerileri | [ ] | [X] | [ ] |
| 3 | Belirlenmiş bir hedef doğrultusunda karmaşık bir sistemi, cihazı veya ürünü gerçekçi kısıtlar ve koşullar altında modern tasarım yöntemlerini de uygulayarak tasarlama becerisi. | [X] | [ ] | [ ] |
| 4 | Maden Mühendisliği Practiceları için gerekli olan modern teknik ve araçları geliştirme, seçme, kullanma ve bilişim teknolojilerinden etkin bir şekilde yararlanma becerisi | [X] | [ ] | [ ] |
| 5 | Maden Mühendisliği problemlerinin incelenmesi için deney tasarlama, deney yapma, veri toplama, sonuçları analiz etme ve yorumlama becerisi | [ ] | [ ] | [ ] |
| 6 | Bireysel çalışma, disiplin içi ve disiplinler arası takım çalışması yapabilme becerisi | [ ] | [ ] | [ ] |
| 7 | Turkish sözlü ve yazılı etkin iletişim kurma becerileri ve yabancı dil bilgisini kullanma/geliştirme becerisi | [ ] | [ ] | [ ] |
| 8 | Yaşam boyu öğrenmenin gerekliliği bilinci; bilgiye erişebilme, bilim ve teknolojideki gelişmeleri izleme ve kendini sürekli yenileme becerisi | [ ] | [ ] | [ ] |
| 9 | Mesleki ve etik sorumluluk bilinci | [ ] | [ ] | [ ] |
| 10 | Project yönetimi ile risk yönetimi ve değişiklik yönetimi gibi iş hayatındaki Practicelar hakkında bilgi; girişimcilik, yenilikçilik ve sürdürebilir kalkınma hakkında farkındalık | [ ] | [ ] | [ ] |
| 11 | Mühendislik Practicelarının evrensel ve toplumsal boyutlarda sağlık, çevre ve güvenlik üzerindeki etkileri hakkında bilgi; ulusal ve uluslararası yasal düzenlemeler ile standartlar hakkında ve mühendislik çözümlerinin hukuksal sonuçları konusunda farkındalık | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Techniques of Writing Business Letters

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| **COURSE CODE** | 151716351 | **COURSE NAME** | Techniques of Writing Business Letters |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 2 | | 0 | 0 | 0 | 2 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | |  | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to introduce the international formats in business letter writing, and also teach the techniques of writing business letters in English language, covering various aspects of business life. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | By the end of this module students will be able to:  Write business letters in English language, and learn the related internationally accepted letter writing formats. | | | | | |
| **TEXTBOOK** | | | | Lecture notes. | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The subjects that will be covered have already been mentioned in the “Objectives of the course” section. |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 |  |
| 11 |  |
| 12 |  |
| 13 |  |
| 14 |  |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [X] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Practice II

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| **COURSE CODE** | 151716355 | **COURSE NAME** | Practice II |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 4 | 0 | | 0 | 0 | 0 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | |  |  | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Summer Practise II course, which provides practical experience related to the application of theoretical knowledge in the field of mining engineering, will increase the knowledge and experience of students about mining. | | | | | |
| **COURSE OBJECTIVE** | | | | Before graduation, students gain knowledge of mining and gain practical knowledge | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | 1. Application of theoretical knowledge  2. Acquisition of Engineering Formation  3. Ability to communicate with staff  4. Identify and solve problems in place | | | | | |
| **COURSE OUTCOMES** | | | |  | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Underground mine practise |
| 2 | - |
| 3 | - |
| 4 | - |
| 5 | Bureau practise |
| 6 | - |
| 7 | - |
| 8 | - |
| 9 | - |
| 10 | Drilling practise |
| 11 | - |
| 12 | - |
| 13 | - |
| 14 | - |
| 15,16 | Final Exam |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [X] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Grinding Technology

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| **COURSE CODE** | 151716347 | **COURSE NAME** | Grinding Tecnology |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The basics of grinding, conventional grindability tests and mil sizing, batch grinding equation, lab tests, simulations of grinding circuits, determination of breakage functions directly and experimentally, back calculation of breakage parameters using batch and continuous mill data | | | | | |
| **COURSE OBJECTIVE** | | | | Explaining the breakage behavior of particles in size reduction, identifying principles of grinding, explaining the relationship between size reduction and energy, calculating breakage parameters are the aims of the lesson. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Characteristics of mills in mineral processing plants, steps to be followed to determine these characteristics and interpreting these results | | | | | |
| **COURSE OUTCOMES** | | | | Formulize design problems of grinding circuits  Learn the basics of size reduction  Learn grindability tests and mill sizing  Calculate the batch grinding equation  Model grinding circuits  Identify breakage functions  Back calculate breakage parameters using batch and continuous mill data | | | | | |
| **TEXTBOOK** | | | | Austin, L.G., Klimpel, R.R., Luckie, P.T., (1984). Process Engineering of Size Reduction | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Lynch, A. J., (1977). “Mineral Crushing and Grinding Circuit”, Elsevier Scientific Publishing Co. 2. Napier, T.J., Morrel, S., Morisson, R. D., Kojoviç, T., (1996). “Mineral Comminution Circuit, Their Operation and Optimization”, JKMRC, The Univeristy of Queensland | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Laws of size reduction |
| 2 | Work index determination methods |
| 3 | Using Hardgrove, Magdelonovic, Karra and Kapur methods |
| 4 | Bond work index determination method |
| 5 | Applying the Bond work index method |
| 6 | Introduction of mills and grinding circuits |
| 7 | Designing ball mills |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Designing rod mills |
| 11 | Mathematical modeling of grinding |
| 12 | Kinetic model |
| 13 | Calculation of breakage rate and breakage distribution |
| 14 | Matrix, multi segment and perfect mixing models |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [X] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Cement Technology

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| **COURSE CODE** | 151716348 | **COURSE NAME** | Cement Technology |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | General description of cement, raw materials and their preparation (Farin preparation (crushing, homogenization, grinding, classification) + calcination), production technology (clinker + additives and grinding), cement types and standard cement tests. | | | | | |
| **COURSE OBJECTIVE** | | | | To give fundamental information about cement raw materials and cement technology,  To give information about the place of mining engineer in cement production. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Have knowledge about cement raw materials, comminution processes (crushing+grinding), classification and homogenization equipment used in cement sector. | | | | | |
| **COURSE OUTCOMES** | | | | Fundamental knowledge about the cement raw materials and cement technology.  Knowledge about comminution (crushing+grinding), classification, homogenization and firing process and equipment involved in cement production.  Information about the place of mining engineer in cement production. | | | | | |
| **TEXTBOOK** | | | | Kuleli, Ö, 2009, “Çimento Mühendisliği El Kitabi”, Türkiye Çimento Müstahsilleri Birliği (TÇMB), Ankara, 265 s. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Prof. Dr. Hayri Yalçin ve Prof. Dr. Metin Gürü, 2006, “Çimento ve Beton”, 15-94s. 2. Türkiye Çimento Müstahsilleri Birliği, 2004, “Çimento, Yeni Bir Çağin Malzemesi” 50s. 3. DPT, 2001, Sekizinci Beş Yillik Kalkinma Plani, Çimento Hammaddeleri Çalişma Grubu Raporu, 62 s. 4. ÇIMHOL A. Ş. Yayinlari, 1989, “Çimento Teknolojisi”. Cilt 1-4. 5. Downloads from World Wide Web. 6. Lecture notes. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction and description of cement |
| 2 | Cement raw materials (main) |
| 3 | Cement raw materials (additives and fuels) |
| 4 | Cement production methods and cement modulus |
| 5 | Raw material preparation (crushing and homogenization) |
| 6 | Raw material preparation (grinding and classification) |
| 7 | Raw material preparation (grinding and classification) |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Firing process |
| 11 | Clinker production (crushing, grinding and classification) |
| 12 | Clinker production (crushing, grinding and classification) |
| 13 | Cement types and properties |
| 14 | Cement standard tests |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [x] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Coal Technology

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| **COURSE CODE** | 151716349 | **COURSE NAME** | Coal Technology |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The Place of Coal in the World and Turkey’s Energy Resources; Introduction to Coal Preparation and Technology, Sampling; Coal Classification; Physical and Chemical Properties of Coal; Inorganic Materials in Coals; Washability Analysis; Coal Preparation; Preparation of Coal for Utilization; Coal Technology: Coking of coal, Coal liquefaction, Gasification of coal, Briquetting of coal. | | | | | |
| **COURSE OBJECTIVE** | | | | This course focuses on teaching the properties of coal, coal preparation and the utilization of coal in conjunction with environmental consequences. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course contributes to the usage of coal by their physical and chemical properties. | | | | | |
| **COURSE OUTCOMES** | | | | 1. To comprehend the importance of coal in the globalizing world. 2. To have a responsibility of naturel resources. 3. To comprehend the necessity of coal preparation. 4. To determine the washability of coals. 5. To gain ability to follow current subjects in mining sector. 6. To understand coal usage and coal technology. | | | | | |
| **TEXTBOOK** | | | | Ateşok,G. (1986) Kömür hazirlama.Güney Grafik, Istanbul. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Önal, G. & G. Ateşok (1997) Kömür Teknolojisi Kullanim Semineri I-II-III-IV-V. Istanbul:Yurt Madenciliğini Geliştirme Vakfi. 2. Kural, O. (2000) Kömür: Kimyasi ve Teknolojisi., Güney Grafik, Istanbul.. 3. Liu, Y.A. (1982) Physical Cleaning ofCoal. Marcel Dekker, Inc., New York, USA. 4. Khoury, D.L. (1981) Coal Cleaning Technology. Noyes Data Corp., New Jersey, USA. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer and Data S how | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Coal Technology and the Usage of Coal |
| 2 | Coal Classification, Physical and Chemical Properties of Coal |
| 3 | The Importance of Coal Properties in Coal Utilization |
| 4 | Introduction to Coal Preparation, the Economic and Technical Necessities of Coal Preparation |
| 5 | Washability and Washability Curves |
| 6 | The Preparation of Coal for Utilization, Crushing and Sieving |
| 7 | Washing of Course Coals |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Washing of Fine Coals and Dewatering |
| 11 | Coal Technology; Coking |
| 12 | Liquefaction and Gasification of Coal |
| 13 | Briquetting of Coals |
| 14 | Laboratory Studies: Coal Analysis |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

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**Date:**

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# Marble Production and Processing Techniques

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| **COURSE CODE** | 151716352 | **COURSE NAME** | Marble Production and Processing Techniques |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | General knowledge about natural stones; Dimension stone production techniques in quarries; Diamond wire sawing techniques and related equipment; Chain block cutters; Jet belt; Factors affecting processing plant location selection; Gangsaws, Block cutters; Cross cutters; Bridge cutters; Polishing machines, Chamfering lines; Water purification in the processing plants; Evaluation of marble waste materials, Legislation. | | | | | |
| **COURSE OBJECTIVE** | | | | Marble, marble sector, marble production and marble processing techniques to have a certain level of knowledge about. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Marble, marble sector, marble production methods and marble processing techniques to give technical information. | | | | | |
| **COURSE OUTCOMES** | | | | \* To learn basic knowledge about marble geology and marble sector.  \* Basic knowledge about marble sector,  \* Basic knowledge of marble production techniques,  \* To obtain basic information about marble processing techniques,  \* To obtain basic information about the use of marble. | | | | | |
| **TEXTBOOK** | | | | \***Göktan, R.M., Güneş Yılmaz, N. (2006)** , Mermer Üretim ve İşleme Teknikleri, Ders Notları. | | | | | |
| **SUPPORTING REFERENCES** | | | | \***Kulaksız, S. (2012)**, Doğal Taş Maden İşletmeciliği ve İşleme Teknolojileri, TMMOB Maden Mühendisleri Odası.\***Kun, N. (2000)**, Mermer Jeolojisi ve Teknolojisi.  \***Onargan, T., Köse, H., Deliormanlı, A.H. (2005)**, Mermer, TMMOB Maden Mühendisleri Odası. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data show. | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | General Information About Marble |
| 2 | Marble Quarry Management |
| 3 | Marble Production Methods and Machines |
| 4 | Marble Production Methods and Machines |
| 5 | Marble Processing Plants and Machines |
| 6 | Marble Processing Plants and Machines |
| 7 | Polishing and Wiping Machines |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Waste Water Treatment Systems |
| 11 | Other Surface Treatment Techniques for Marbles |
| 12 | Marble Residues and Evaluation Facilities |
| 13 | Legal Relationships in Marble Quarry Management |
| 14 | English-Turkish Terms |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mine Systems Analysis

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| **COURSE CODE** | 151716353 | **COURSE NAME** | Mine Systems Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 20 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 50 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 30 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | System and constructing system; system engineering; system analysis; introduction to Operation Research; decision making; linear programming; solving linear programming problems; duality and sensitivity analyses in linear programming; integer programming; introduction to network analysis; minimum distribution problem; shortest path problem; CPM/PERT methods. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to give the students an introduction of Operation Research applications in mining. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Understanding and solving of Operations Research problems in mining sector. | | | | | |
| **COURSE OUTCOMES** | | | | Ability to solve decision making problems in mining.  Ability to form mathematical model.  Ability to solve mathematical model.  Ability to analyze of model output. | | | | | |
| **TEXTBOOK** | | | | Taha, H. A., (2000). “Yöneylem Araştirmasi”, Literatür Yayinevi, 6. Basimdan Çeviri, Çevirenler: Baray, Ş. A. ve Esnaf, Ş. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Elevli, Birol, (2000). “Sistem Analizi”, Dumlupinar Üniversitesi, Yayimlanmamiş Ders Notlari. 2. Erçelebi, S. G., (2000). “Madencilik Sektöründe Bilgisayarli Optimizasyon Uygulamalari, Madencilik Sektöründe Bilgisayar Uygulamalari Eğitim Semineri, Yurt Madenciliğini Geliştirme Vakfi, 18–20 Aralik 2000. 3. Kara, I. (1985). “Yöneylem Araştirmasinin Yöntem Bilimi”. Eskişehir: Anadolu Üniversitesi Yayinlari. 4. Kara, I. (1991). “Doğrusal Programlama”. Eskişehir: Bilim Teknik Yayinevi. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Mine System Analysis, What is System?, Construction of System |
| 2 | Introduction to Operations Research, Stages of System Analysis, Decision Making |
| 3 | Introduction to Linear Programming, Graphical Solution Method, Applications |
| 4 | Simplex Method in Linear Programming, Applications |
| 5 | Sensitivity Analysis in Linear Programming, Applications |
| 6 | Introduction to Nonlinear Programming, Applications |
| 7 | Sensitivity Analysis in Nonlinear Programming, Applications |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Introduction to Integer Programming, Applications |
| 11 | Introduction to Dynamic Programming, Applications |
| 12 | Introduction to Network Analysis, Minimum Distribution Problem, Applications |
| 13 | The Shortest Path Method, the Maximum Flow Problem, Applications |
| 14 | CPM / PERT Methods, Construction of Network, Finding the Critical Path, Applications |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Soil Mechanics

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| **COURSE CODE** | 151716354 | **COURSE NAME** | Soil Mechanics |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 4 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Description and physical properties of soils. Soil classification and compaction. Total and effective stress concepts. Strength and slope stability. | | | | | |
| **COURSE OBJECTIVE** | | | | Basic purpose of this course is to increase the knowledge of the students about soil mechanics and to introduce basic concepts of soil mechanics. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Development of the ability to describe and asses the soils | | | | | |
| **COURSE OUTCOMES** | | | | 1. Understanding of basic principles of soil mechanics 2. Gaining the ability to describe and assess the soils 3. Understanding Total and effective stress concepts 4. Understanding the soil strength concept 5. Gaining general knowledge about shear strength tests 6. Slope stability | | | | | |
| **TEXTBOOK** | | | | Soil mechanics textbooks and Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Kumbasar V., Kip F., (1985), Zemin Mekaniği Problemleri, Çağlayan Yayinevi: ISTANBUL  2. Özaydin K., Zemin Mekaniği, Birsen Yayinevi,: ISTANBUL  3. Uzuner B.Ali., Temel Zemin Mekaniği, Birsen Yayinevi:ISTANBUL  4. Craig, R.F., (1989), Soil Mechanics, Van Nostrand, Reinhold, 410p.  5. Berry, L and Reid, D., 1987, An Introduction to Soil Mechanics, McGraw-Hill, 317p.  6. Kovacs, W.D., 1981 An Introduction to Geotechnical Engineering, Prentice-hall, 733 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | The description, formation and structure of soils |
| 2 | Physical properties of soils. |
| 3 | Soil classification. |
| 4 | Compaction and consolidation in soils |
| 5 | Underground water and seepage |
| 6 | Total and effective stress concepts |
| 7 | Strength |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Strength |
| 11 | Stress distribution and lateral stress |
| 12 | Shear strength tests |
| 13 | Soil stability |
| 14 | Soil stability |
| 15,16 | Final Exam |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [x] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mining Machines

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| **COURSE CODE** | 151717630 | **COURSE NAME** | Mining Machines |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Underground compressed air distribution system and calculations; Shaft hoisting systems; Mine Skips and Cages; Drum and Koepe winding systems; Towers and head frame arrangements; Steel ropes: types, characteristics and maintenance; Shaft hoisting capacity calculations; Rope and winch calculations for inclined shaft hoisting systems. | | | | | |
| **COURSE OBJECTIVE** | | | | 1. To provide compressed air usage in mines and, to give calculation procedure for design of underground compressed air distribution system.  2. To provide basic concept of compressed air and compressors.  3. To introduce shaft hoisting systems and, to give calculations related with it.  4. To gain the capability of selecting steel ropes for shaft hoisting systems.  5. To provide basic concept and calculations related with design of inclined shaft hoisting systems. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course will make occupational contribution to the evaluation of stability analyses of rock slopes in surface mining operations. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn the basic principles and design of underground compressed air distribution systems.  2. Learn the basic principles and design of underground shaft hoisting systems | | | | | |
| **TEXTBOOK** | | | | Göktan, R.M. (2002), Maden makinaları, Lecture notes. | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Usage of compressed air in mines and compressors; Basic gas laws |
| 2 | Controlling of temperature during air compression process (isothermic and adiabatic compression) |
| 3 | Condensation of water vapour in compressed air distribution systems |
| 4 | Pressure loss in compressed air pipe lines; Calculations for underground compressed air distribution system |
| 5 | Shaft hoisting systems |
| 6 | Mine Skips and Cages; Drum and Koepe winding systems |
| 7 | Mine Skips and Cages; Drum and Koepe winding systems |
| 8 | Midterm |
| 9 | Towers and head frame arrangements |
| 10 | Towers and head frame arrangements |
| 11 | Steel wire ropes; Calculations for rope selection |
| 12 | Steel wire ropes; Calculations for rope selection |
| 13 | Shaft hoisting capacity calculations |
| 14 | Rope and winch calculations for inclined shaft hoisting systems |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [x] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [x] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mine Ventilation

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| **COURSE CODE** | 151717419 | **COURSE NAME** | Mine Ventilation |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 4 | | 0 | 0 | 4 | 6 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The definition of underground mine air, methane, mine dust and mine climate, physical properties of mine air, measurement instruments, ventilation networks, the determination of required air, auxiliary ventilation and mine fires. | | | | | |
| **COURSE OBJECTIVE** | | | | Investigation of mine air, gas and dust, examination of mine climate and the solution of mine ventilation network. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Learning the design of underground mine ventilation networks and to create safe working conditions. | | | | | |
| **COURSE OUTCOMES** | | | | The explain of dangerous mine gas and dust’s limit values, the form of mine ventilation network, the determination of volume flow rate reaching to the face, the calculation of natural ventilation, precaution of mine fire. | | | | | |
| **TEXTBOOK** | | | | ÖNCE G.,SARAÇ, S., 1986, “Madenlerde Havalandirma” | | | | | |
| **SUPPORTING REFERENCES** | | | | Mc Pherson, M.J., 1993, “Subsurface Ventilation and Environmental Engineering”,Chapman&Hall | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, datashow. | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Mine air |
| 2 | Methane |
| 3 | Mine dust |
| 4 | Mine climate |
| 5 | Physical properties of air, measurement devices |
| 6 | Ventilation network |
| 7 | Ventilation network |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Natural ventilation |
| 11 | Mine ventilation by fans |
| 12 | The distribution of mine air |
| 13 | The calculation of required air at the face |
| 14 | Auxiliary ventilation |
| 15 | Mine fires |
|  | Final Examination |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Design of Supports in Mines and Tunnels

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| **COURSE CODE** | 151717631 | **COURSE NAME** | Design of Supports in Mines and Tunnels |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 4 | | 0 | 0 | 4 | 6 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Wooden support and systems; engineering characteristics of mine timber, design of wooden supports, steel gallery supports; engineering characteristics of steel, roof bolts and trusses; principle and varieties of roof bolts, design of roof bolts, steel longwall supports; steel props and caps, evaluation of steel longwall support, powered support, applicability of powered supports, concrete supports: constituents of concrete, engineering characteristics of concrete, applications of concrete in mines, | | | | | |
| **COURSE OBJECTIVE** | | | | Explaining and teaching the support materials in underground mines. Showing the applications of gallery and longwall support systems, explaining the importance of supports in mines in terms of safety. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Selection the support material and system in an underground opening. Design of a support system | | | | | |
| **COURSE OUTCOMES** | | | | 1. Define loads and pressures on supports by using some empirical and analytical methods 2. Teach support materials and mechanical behavior of support materials 3. Design of support in mines 4. Learn support systems in galleries and longwalls 5. Analysis, solving and choose of support in mines 6. Learn the comparison of different support systems 7. Understand the importance of safety about support systems | | | | | |
| **TEXTBOOK** | | | | 1. Biron, C. ve Arioğlu, E.,Madenlerde Tahkimat Işleri ve Tasarimi, Birsen Kiabevi. Istanbul, 1999. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Design of Support in Mines, Cemal BIRON, Ergin ARIOĞLU, John Willey & Sons Inc., 1983 ABD. 2. Tahkimat, Sadrettin ALPAN, Maden Teknik Arama Ens. Yayini, Eğitim Serisi No:1, Ankara 1970 3. Maden Başçavuşlari için Maden Işletme Notlari, TKI, ZTI, Yayin No:47, 1985 4. Mining Engineering Handbook, SME, ‘2nd Edition, Vol.1-2, Howard L. Hartman, Senior Editor. 1992, ABD. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show, | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Determining loads and pressures on supports in galleries and longwalls |
| 2 | Wooden Supports and their applications in galleries and longwalls |
| 3 | Selection and design of wooden support systems, |
| 4 | Steel support systems in galleries |
| 5 | Steel longwall supports; steel props and caps, evaluation of steel longwall support |
| 6 | Selection and design of steel support systems in mines |
| 7 | Hydraulic support, powered support systems, applicability of powered supports |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Roof bolts and trusses; principle and varieties of roof bolts |
| 11 | Design of roof bolts and trusses |
| 12 | Concrete supports: constituents of concrete, engineering characteristics of concrete |
| 13 | Concrete support in galleries and mine shafts. Design of concrete supports, |
| 14 | Stowing; applications of stowing systems in mines, design of stowing systems. |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mining and Labor Law

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| **COURSE CODE** | 151717641 | **COURSE NAME** | Mining and Labor Law |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 2 | | 0 | 0 | 0 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Mining license rights (exploration, operation), Mining license activities and supervision, Duties, powers and responsibilities of permanent caretakers, lien, pledge, mortgage, service contract rules, rights in determination of fee employee finding, inspection and inspection of business life | | | | | |
| **COURSE OBJECTIVE** | | | | To teach the rules of mining and labor law | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students will find solutions to the legal problems they will face in business life | | | | | |
| **COURSE OUTCOMES** | | | | 1. To learn mining license rights, 2. To comprehend the duties, powers and responsibilities of permanent caretakers, 3. To learn the terms of foreclosures, pledges, injunctions and mortgages, 4. To learn the service contract rules in Labor Law, | | | | | |
| **TEXTBOOK** | | | | Mining Law No. 3213  Labor Law No. 4857 | | | | | |
| **SUPPORTING REFERENCES** | | | | Maden Hukuku, Doç.Dr. Mustafa Topaloğlu, Karahan Yayınları, Adana, 2003. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Service contract rules in Labor Law, |
| 2 | Service contract rules in Labor Law, |
| 3 | Rights in determining the fee, |
| 4 | Rights in determining the fee, |
| 5 | Organization of working hours, |
| 6 | Job and employee discovery, inspection of business life, |
| 7 | Introduction to Mining Law |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Mining license rights (Search, operation and finder) |
| 11 | Mining license activities, |
| 12 | Mining license activities, |
| 13 | Duties, powers and responsibilities of permanent caretakers, |
| 14 | Foreclosures, pledges, injunctions and mortgages |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | **[ ]** | **[ ]** | **[ ]** |
| 2 | An ability to identify, formulate and solve mining engineering problems. | **[ ]** | **[ ]** | **[ ]** |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | **[ ]** | **[ ]** | **[ ]** |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | **[ ]** | **[ ]** | **[ ]** |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | **[ ]** | **[ ]** | **[ ]** |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | **[ ]** | **[ ]** | **[ ]** |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | **[ ]** | **[ ]** | **[ ]** |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | **[ ]** | **[ ]** | **[ ]** |
| 9 | An understanding of professional and ethical responsibility. | **[ ]** | **[X]** | **[ ]** |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | **[ ]** | **[ ]** | **[x]** |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | **[ ]** | **[ ]** | **[ ]** |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Design of Experiment in Mineral Processing

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| **COURSE CODE** | 151717632 | **COURSE NAME** | Design of Experiment in Mineral Processing |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 10 | |
| **FINAL EXAM** | | | |  | | | 1 | 30 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Units and conversions, Basic statistical concepts, Design of two and three level multi-factor experiments, Modeling and experimental optimization. | | | | | |
| **COURSE OBJECTIVE** | | | | To learn how to plan, design and conduct an experiment efficiently and effectively, and analyze the resulting data to obtain objective conclusions. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | 1. Understands the importance of unit conversions 2. Understands the importance of basic statistical concepts 3. Creates a design of two-level and two-variable 4. Creates a design of two-level and multi-variable 5. Evaluates the results of experiments by analysis of variance (ANOVA) 6. Reviews the results of analysis of variance 7. Creates an empirical model 8. Optimize the experimental results | | | | | |
| **TEXTBOOK** | | | | Özensoy, E., “Teknolojik ve Bilimsel Araştirmalarda Modern Deney Tasarimciliği ve Optimizasyon”, MTA Enstitüsü Eğitim Serisi No:24, Ankara 1982. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Hicks, C.R., “Fundamentals Concepts in the Design of Experiments”, USA 1973. 2. Montgomery, D.C., “Design and Analysis of Experiments” Third edition, John Wiley & Sons, USA 1991. 3. Larry B.B., “An Introduction to Design of Experiments”, ASQ Quality Press, 1999. 4. Erbaş, S.O ve Olmuş H., “Deney Düzenleri ve Istatistik Analizleri”, Gazi kitabevi, 2006. 5. Ersoy Y. Ve Mert M., “Boyut Analizi ve Fiziksel Ölçmeler” ODTÜ Müh. Fak. Yayini No:55, Ankara 1977. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show, Excel or Visual Basic Program | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to design of experiments, and overview the basic statistical concepts |
| 2 | Units and conversions |
| 3 | Single factor experiments |
| 4 | Introduction to factorial designs |
| 5 | 22 factorial designs |
| 6 | Introduction to the analysis of variance (ANOVA) |
| 7 | Introduction to regression models |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | 23 factorial designs and applications |
| 11 | 24 factorial designs and applications |
| 12 | 25 factorial designs and applications |
| 13 | Optimization of the factors |
| 14 | A general application |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [X] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Industrial raw materials and processing tecnniques

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| **COURSE CODE** | 151717633 | **COURSE NAME** | Industrial raw materials and processing tecnniques |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Definition and classification of industrial raw materials. Physical, chemical, geological and mineralogical properties, practical uses and processing techniques applicable to raw materials that can be processed. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aims of the course are to: Define the industrial materials, and teach their uses in practise. Teach the various properties of raw materials and other products obtained from them. Teach the related processing techniques applicable to raw materials that can be processed. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students can work in industrial mineral companies after taking this lesson. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Have a recognition of industrial raw materials that have big reserves in the earth’s crust. 2. Understand required conditions for minerals economical evaluation. 3. Learn laboratory tests applicable to raw materials and other products obtained from them. 4. Learn mineral processing methods. 5. Have necessary information about industrial raw materials and related processing techniques. | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Bozkurt R. (1989). Endüstriyel Hammaddeler, A.Ü. Müh. Mim. Fakültesi Yayinlari, No. 97 2. Önem Y. (1997). Sanayi Madenleri, Kozan Ofset 3. D.P.T. Özel Ihtisas Komisyonu Raporlari | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Importance of industrial minerals for mining engineers and Turkey. |
| 2 | Description and classification of industrial minerals , examples. |
| 3 | Marble |
| 4 | Brick and tile raw materials |
| 5 | Cement raw materials |
| 6 | Boron minerals, description, types, usage, boron minerals in Turkey and world. |
| 7 | Concentration of boron minerals and boron plants in Turkey. |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Trona |
| 11 | Magnesite, description, types, usage, magnesite in Turkey and world. |
| 12 | Concentration of magnesite and magnesite plants in Turkey |
| 13 | Ceramic raw materials |
| 14 | General evaluation of subjects |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [X] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Ceramics Technology

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| **COURSE CODE** | 151717634 | **COURSE NAME** | Ceramics Technology |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to Ceramics: Ceramic raw materials, Production of raw materials, Tests applied to raw materials, Preparation of raw materials,  Body preparation, Shaping, Drying, Glazing, Firing, Quality control.  Ceramics Technology: Calculations of body composition, Calculations of glaze composition, Colored glazes, Properties of glaze, Furnace, Types of furnaces, Refractories, Types of refractory, Porcelain, Advance ceramics. | | | | | |
| **COURSE OBJECTIVE** | | | | Formation of ceramic raw materials, physical and chemical properties of raw materials, applied processes during production of ceramics are taught to students. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To give information to students about ceramic raw materials and ceramic production. | | | | | |
| **COURSE OUTCOMES** | | | | Students can direct producers of ceramic raw materials, can work in ceramic factories and can produce ceramic products in their workshops. | | | | | |
| **TEXTBOOK** | | | | Güner, Yüksel, ‘Seramik’, Gençlik Kitabevi A.Ş./Seç Kitap Dağitim, 1987. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Tanişan, H. Hüseyin ve Mete, Zeliha, ‘Seramik Teknolojisi ve Uygulamasi’, Cilt 1, Birlik Matbaasi-Söğüt, 1988. 2. Arcasoy, Ateş, ‘Seramik Teknolojisi’, Marmara Üniversitesi Yayin No:457, 1983. 3. TMMOB Kimya Mühendisleri Odasi, ‘Seramik’, 1980. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Ceramics: Ceramic Raw Materials |
| 2 | Production of Raw Materials, Tests Applied to Raw Materials |
| 3 | Preparation of Raw Materials, Body Preparation |
| 4 | Shaping |
| 5 | Drying |
| 6 | Glazing |
| 7 | Firing, Quality Control |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Calculations of Body Composition |
| 11 | Calculations of Glaze Composition |
| 12 | Calculations of Glaze Composition |
| 13 | Colored Glazes, Properties of Glaze |
| 14 | Furnaces, Refractories, Porcelain, Advance Ceramics |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Mineral Charac. and Anal. Tech.

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| **COURSE CODE** | 151717635 | **COURSE NAME** | Mineral Charac. and Anal. Tech. |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
| X | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 25 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 25 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The importance of mineral characterization and process mineralogy. The relations between valuable and invaluable minerals in ores and effect of these relations on ore dressing and mineral processing results. The methods used to determine the mineralogical properties of ore samples to be processed. Preparation of samples for the devices to be used for mineral characterization. General information for optical microscopy, ore microscopy, image analysis, XRD, XRF, SEM, DTA and TGA analysis techniques and interpretation of the results. | | | | | |
| **COURSE OBJECTIVE** | | | | The aim of this course is to teach the analysis techniques to determine the ore bearing minerals in ore dressing and mineral processing and to ensure the interpretation ability of the students after application of these techniques on ore samples. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The properties that will affect the processing of an ore, the required anayses to determine these properties and interpret the results obtained. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn the basic concepts of structure and tissue of ore bearing minerals. 2. Understanding the main principles of process and devices to be used for sample preparation. 3. Understand the general ore characterization methods. 4. Learn the sample preparation for microscopic investigations. 5. Learn the image analysis method in ore characterization. 6. Knowledge about analyses methods such as XRD, XRF, SEM, DTA and TGA analyses. 7. Prepare the working results as a report and present them. | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Petruk, W., Applied Mineralogy in the Mininig Industry, Elsevier, The Netherlands, p. 268, 2000. 2. Hausen D. M. And Park W. C., Process Mineralogy, Extractive Metallurgy, Mineral Exploration, Energy Resources, The Metallurgical Society of AIME, 1982. 3. Petruk, W., Short Course on Image Analysis Applied to Mineral and Earth Sciences, Mineralogical Association of Canada, 1989. 4. Göymen, G., Maden Minerallerinin Yapi ve Dokulari, EDMMA Yayinlari, No:5, 1977. 5. Genç, Y., Cevher Mikroskobisi, 1998. 6. Cabri, L. J. And Vaughan, D. J., Modern Approaches to Ore and Environmental Mineralogy, International Mineralogical Association, 1998. 7. Jones, M. P., Applied Mineralogy: A Quantitative Approach, Graham & Trotman, 1987. 8. Akinci, Ö. T., Cevher Mikroskobisi ve Mineral Tanimlamalari, SDÜ Yayin No: 4, 1999. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | A cutting machine for cutting the ore samples, a hot moulding machine to mould thecutted ore samples, cold moulding resins to mould the particulate minerals. A polishing machine to polish the moulded ore samples. An ore microscopy for examining the prepared samples. An image analysis device. | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Aim of the course, to give the general information for contents of lesson, to introduction the references of lesson. |
| 2 | The importance of ore characterization and process mineralogy |
| 3 | Introduction to structure and tissue in ores |
| 4 | Properties of ore structures and tissues |
| 5 | Definition of minerals in the ores |
| 6 | Sample preparation for thin and polished sections. Importance of ore microscope and its usage in miveral preparatinn and processing. |
| 7 | Image analysis and its usage in mineral processing |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | X-ray diffraction technique and the properties determined by XRD |
| 11 | XRF and other chemical analysis techniques |
| 12 | DTA and TGA methods and the properties to be determined |
| 13 | SEM analysis and ore properties to be determined |
| 14 | Evaluation of the results and report |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [x] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [x] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Material and Metallurgy

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| **COURSE CODE** | 151717636 | **COURSE NAME** | Material and Metallurgy |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 6 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Minerals: The Foundations of Society; Classification of Metallurgy and Metals; Metallurgic Furnaces, Fuels and Refractory Materials; Iron and Steel Production, Copper Production, Solution Mining / Hydrometallurgy, Aluminum Production, Magnesium Production, Lead and Zinc Production and Gold and Silver Production methods. | | | | | |
| **COURSE OBJECTIVE** | | | | Brief introduction to the minerals: The Foundadion of Society. Classification of metallurgy and metals, Description and classification of metallurgical methods, metallurgical furnaces, fuels and burning, and refracrory materials. Production technology and flowsheets of pig iron and steel are introduced. Brief introduction to hydrometallurgy are given. Some knowledge about the production of Cu, Al, Mg, Pb, Zn, Au andA g metals are given. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Metalurgy is a compulsory course for Mining Engineering education in the world. For the professional training point of view, learning the theory and plant applications of the metal extraction and purification steps along with flowsheets are very important gains for students.  most widely used mineral separation process is very important. | | | | | |
| **COURSE OUTCOMES** | | | | 1.Learning about minerals and their life expectancies in the world.  2. Classifying metallurgy and metals.  3. Metalurgical furnaces and fuels are covered.  4. Refractory materials are classified and selected for metallurgical applications.  5. Iron and stell production methods are covered in detail.  6. Cooper production from sulphide/oxide Cu ores are given.  7. Al and Mg metal production flowsheets are covered.  8. Pb and Zn production flowsheets are introduced.  9. Precious metal recovery techniques are given.  10. Metallurgical problems are solved. | | | | | |
| **TEXTBOOK** | | | | Kaya M. (2010), Maden Mühendisleri için Metalurji, Eskişehir. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. J. R. Davis, Asm International Handbook Committee, Metals Handbook 2. D.A. Brandt, Metallurgy Fundamentals: Ferrous and Nonferrous 3. B.J. Moniz, Metallurgy | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Minerals: The Foundations of Society |
| 2 | Classification of Metallurgy and Metals |
| 3 | Metallurgical Furnaces and Fuels |
| 4 | Refractory Materials Classifications and Properties |
| 5 | Pig Iron Production Methods |
| 6 | Blast Furnace Reactions |
| 7 | Problem Solution |
| 8 | Midterm Exam |
| 9 | Steel Production Methods |
| 10 | Hydrometallurgy and Cu Production Methods |
| 11 | Aluminum Production Technology |
| 12 | Mg, Pb and Zn Production Flowsheets |
| 13 | Au and Ag Cyanidation |
| 14 | Metallurgical Problems Solutions |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [X] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Modelling in Mineral Processing

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| **COURSE CODE** | 151717637 | **COURSE NAME** | Modelling in Mineral Processing |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The importance of modeling and the mathematical model development stages, the importance of the balance of material in the model development, the material balance of simple and complex circuits in the mineral processing, modeling goals, benefits, and stages, modeling errors and their solutions, types of mathematical model and analysis of the sample models. | | | | | |
| **COURSE OBJECTIVE** | | | | In mineral processing and ore beneficiation, giving an overview of the theoretical information and good practices about model and modelling, to build up the necessary infrastructure knowledge for graduate studies and professional studies by students in this field. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students can have the infrastructure knowledge about studies of analysis, optimization, design and process control in mineral processing, and apply it. | | | | | |
| **COURSE OUTCOMES** | | | | 1. To grasp importance of the modelling and model development stages in mineral processing.  2. To have the infrastructure knowledge needed for postgraduate studies and research in the scientific modelling.  3. To have detailed information about the material balance calculations in simple and complex process circuits and to apply it in processes.  4. Learning about the types of mathematical model, to develop able to analyze the ability about models faced by students.  5. Learning the sample models and analyzing, they can produce solutions to the problems faced in this area in the future. | | | | | |
| **TEXTBOOK** | | | | Lecture notes | | | | | |
| **SUPPORTING REFERENCES** | | | | 1) Modeling and Simulation Lecture Notes, 1990, Universite Laval, Canada,  2) Gupta, A. and Yan, DS, 2006, Introduction to Mineral Processing Design and Operation, Australia  3) published articles in this area | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Importance and definition of the model and modeling |
| 2 | General Concepts and Technical Terms  (Real Process, Circuit, Unit, Substance Balance, Variables, Simulation, Simulator) |
| 3 | Substance balance of the system and the calculations (in the simple mineral processing circuits) |
| 4 | Substance balance calculations in mixed mineral processing circuits |
| 5 | Mineral processing modeling aims and benefits |
| 6 | General stages of modeling, facing errors and solutions |
| 7 | Stages of mineral processing modeling, model types and qualifications in the model |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Sizing Mill of the milling process (macro-phenomenal model) |
| 11 | Estimation of flotation Efficiency, calculation of turbulence in flotation column (Macro and Micro Modeling) |
| 12 | Estimation of of turbulence Jameson flotation cell (micro-phenomenal model) |
| 13 | Sizing column flotation (micro-phenomenal model) |
| 14 | Empirical Model: Hold-Up Modeling in Jameson Flotation Cell |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [x] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Wastewater Treatment

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| **COURSE CODE** | 151717638 | **COURSE NAME** | Wasterwater Treatment |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | General information about water pollution and its importance; Industrial wastewater resources and control methods; Psychical-chemical-biological methods used for wastewater treatment; Examples from industrial applications. | | | | | |
| **COURSE OBJECTIVE** | | | | to learn the environmental conscious and the necessity and importance of wastewater treatment for preventing environmental pollutions. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Describe problems, solve and evaluate the values | | | | | |
| **COURSE OUTCOMES** | | | | Develop the responsibility of occupational conscious in terms of environment protection  Understand the some basic concepts and technologies about topic.  Apply the mineral processing methods to wastewater treatment, select the suitable method and develop the flow sheets | | | | | |
| **TEXTBOOK** | | | | Muslu Y., “Atiksularin Aritilmasi”. Istanbul Teknik Üniversitesi Matbaasi, Istanbul,1994. | | | | | |
| **SUPPORTING REFERENCES** | | | | Mc Graw Hill. “Wastewater Engineering, Treatment, Disposal and Reuse”, Metcalf and Eddy, Inc 1991.  David L. Russell, PE, “Practical Waswater Treatment”, Global Environmental Operations, Inc.,Lilburn, Georgia, 2006 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Books related to topic. | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | General information about water pollution and its importance |
| 2 | Industrial wastewater resources |
| 3 | Industrial wastewater resources and control methods |
| 4 | Psychical methods used for wastewater treatment |
| 5 | Psychical methods used for wastewater treatment |
| 6 | Chemical methods used for wastewater treatment |
| 7 | Chemical methods used for wastewater treatment |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Biological methods used for wastewater treatment |
| 11 | Biological methods used for wastewater treatment |
| 12 | Examples from industrial applications. |
| 13 | Examples from industrial applications. |
| 14 | Examples from industrial applications. |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [X] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Environmental Problems in Mining

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| **COURSE CODE** | 151717639 | **COURSE NAME** | Environmental Problems in Mining |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | | X | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Environment and Environmental Pollution: Environment affected from pollutions; Mining and Environment: Environmental effects of mining methods and reclamation; Environmental effects of coal and mineral processing plants; Water Pollution: Sources of water pollutions, Water usage in mineral industry and environmental effects; Air Pollution: Sources of air pollution, Environmental effects of industrial coal utilization, Air pollution control methods; Soil Pollution and Control; Methods; Gold Beneficiation Methods and Environmental Effects; Laws Related to Environmental Pollution Control in Turkey and World; (EIA) Reports. | | | | | |
| **COURSE OBJECTIVE** | | | | This course focuses on teaching environmental problems during mining activities and to establish a comprehensive knowledge on methods to prevent environmental pollutions. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course contributes to the mining sector how to correlate mining activities in conjunction with environmental point of view. | | | | | |
| **COURSE OUTCOMES** | | | | To gain a sense of professional ethics and a sense of responsibility  To understand and analyze the environmental responsibility  To have a responsibility of natural resources.  To gain ability to follow current subjects in mining sector  To gain ability to have information in mining law and mining legislation  To gain ability to evaluate the relationship between mining and environment on a scientific basis | | | | | |
| **TEXTBOOK** | | | | Ersoy, A., 2000, Madencilik ve Çevre, Çukurova Üniversitesi | | | | | |
| **SUPPORTING REFERENCES** | | | | Course text books  Elevli, B.,1998, Madencilik,Çevre ve ÇED Raporu, Cumhuriyet Üniversitesi.  Karadeniz, M., 1996, Cevher Zenginleştirme Tesis Atiklari, Çevreye Etkileri, Önlemler, MTA Genel Müdürlüğü.  **Önal, G., Yüce,E., Karahan ,S., 1995, Türkiye’de Altin Madenciliği,Yurt Madenciliği Geliştirme Vakfi.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Mining and environment concept |
| 2 | Open pit mining and environmental effects |
| 3 | Underground mining and environmental effects |
| 4 | Cause of water pollution in mining and environmental effects |
| 5 | Cause of air pollution in mining and environmental effects |
| 6 | Environmental effects of industrial coal utilization and flue gas desulphurisation and particulate emissions from flue gases |
| 7 | Environmental effects of industrial coal utilization and flue gas desulphurisation and particulate emissions from flue gases |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Reclamation |
| 11 | Soil pollution and precautions |
| 12 | Waste of mineral processing plants and tailing dams |
| 13 | Environmental effects of gold mining, disposal of cyanide wastes and re-use of cyanide |
| 14 | Preparation of environmental impact assesment (EIA) reports |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [x] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Environment and Safety in Mining

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| **COURSE CODE** | 151717640 | **COURSE NAME** | Environment and Safety in Mining |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The concept of environment, air, water ,land and noise pollution, the reasons of environment pollution, environmental effects of open pit mining and underground mining, Environmental Effect Evaluation, Air Quality Control Regulation, the arrangement of environment after mining, Environmental Law and Regulation related to mining in World Country and Turkey . | | | | | |
| **COURSE OBJECTIVE** | | | | Investigation of environmental protection regulations, environmental effects of open and underground mining and rearrangement of environment. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The selection of appropriate production methods in open pit and underground mining, be aware of mining regulations, to take precautions to protect of mining environment | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn environment concept. 2. Learn the reason of environmental pollution. 3. Learn environmental effects of open pit mining and underground mining. 4. Learn the arrangement of environment after mining. 5. Learn Environmental Law and Regulation related to mining. | | | | | |
| **TEXTBOOK** | | | | 1. Birol ELEVLI, “Madencilik, Çevre ve ÇED Raporu”, 1998 2. Adem ERSOY, “Madencilik ve Çevre”, 2000 3. **McPherson, M.J. (1993).** Subsurface Ventilation and Environmental Engineering. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Hartman, H.L (1991). Mine Ventilation and Air Conditioning. 2. Önce,G., & Saraç,S. (1986). Madenlerde Havalandirma 3. Güyagüler, T., Karakaş, A.,& Güngör, A. (2005). Occupational Health and Safety in Mining Industry. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Environmental pollution |
| 2 | Air and water pollution |
| 3 | Land and Noise pollution |
| 4 | Environmental effects of open pit mining |
| 5 | Environmental effects of underground mining |
| 6 | Environment Protection Regulations |
| 7 | Environment Effect Regulations |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Air Quality Protection Regulations |
| 11 | Dust and Worker Safety |
| 12 | Environmental pollution and effects on living. |
| 13 | Environmental Law and Regulation related to mining in World Country and Turkey . |
| 14 | Effects on the employee environmental conditions of the underground |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Excavation Machines and Mechanization

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| **COURSE CODE** | 151718549 | **COURSE NAME** | Excavation Machines and Mechanization |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 3 | |  | 0 | 3 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to rock excavation; Picks; Rock cutting principles; Specific energy; Tool consumption; Laboratory rock cutting experiments; Rock cutting theories; Roadheaders; Excavation machine selection for underground coal mines; Ploughs; Shearers; Diggability assessment in open pit mines; Diggability classification systems. | | | | | |
| **COURSE OBJECTIVE** | | | | 1. Provide the basic principles of rock excavation.  2. Give application areas of mining machines and excavation machine selection.  3. Introduce performance prediction methods developed for rock excavation machines. | | | | | |
| **CONTRIBUTION OF THE COURSE TO THE PROFESSIONAL TRAINING** | | | | This course will make occupational contribution to the mining machines in mechanized excavation and technical calculations required for performance prediction of them. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Comprehend the basic principles of rock excavation and mine mechanization.  2. Learn the factors which affect the choice of mechanical excavators for particular mining applications.  3. Apply the prediction performance methods for different rock excavation machines.  4. Understand performance prediction methods developed for rock excavation machines.  5. Aware of example applications of mechanized excavations in Turkey. | | | | | |
| **TEXTBOOK** | | | | Göktan, R.M and Güneş Yılmaz, N. (2006). Excavation Machines and Mechanization, Lecture Notes. | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Picks Used in Mechanized Excavation |
| 2 | Cutting Tool Design Parameters Affecting Performance |
| 3 | Rock Cutting Tools, Rock Cutting Mechanics, Specific Energy, Rock Cutting Theories, Performance Prediction. |
| 4 | Laboratory Rock Cutting Experiments |
| 5 | Roadheaders |
| 6 | Mechanized Excavation in Longwall |
| 7 | Ploughs, Calculation of Production Rate Achieved by Plows |
| 8 | Midterm |
| 9 | Drum Shearers |
| 10 | Drum Shearers |
| 11 | Excavation Capacity Calculations for Shearers |
| 12 | Longwall Automation |
| 13 | Applications of Mechanized Excavations in Turkey |
| 14 | Diggability Assessment in Open Pit Mines |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | **[X]** | **[ ]** | **[ ]** |
| 2 | An ability to identify, formulate and solve mining engineering problems. | **[ ]** | **[X]** | **[ ]** |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | **[ ]** | **[ ]** | **[ ]** |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | **[ ]** | **[ ]** | **[ ]** |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | **[ ]** | **[ ]** | **[ ]** |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | **[ ]** | **[X]** | **[ ]** |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | **[ ]** | **[ ]** | **[ ]** |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | **[ ]** | **[ ]** | **[ ]** |
| 9 | An understanding of professional and ethical responsibility. | **[ ]** | **[ ]** | **[ ]** |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | **[ ]** | **[ ]** | **[ ]** |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | **[ ]** | **[ ]** | **[ ]** |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mining Economy

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| **COURSE CODE** | 151718550 | **COURSE NAME** | Mining Economy |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Microeconomic concepts, Macroeconomic concepts, Ffaiz and present value calculations, Depreciation calculations, Properties of mining investments, Evaluation of mining investment projects, Investment profitability analysis, Risk and sensitivity analysis. | | | | | |
| **COURSE OBJECTIVE** | | | | To gain general economics knowledge and methods of evaluation of mining investment projects. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students will be able to prepare mine operations projects and make profitability analysis. | | | | | |
| **COURSE OUTCOMES** | | | | Micro and Macro economics knowledge. To teach interest and present value calculations To teach depreciation accounts To gain the methods of evaluation of mining investment projects. To teach risk and sensitivity analysis To be able to analyze data To know the principles of evaluation of application projects. Economic Analysis of Mining Project. | | | | | |
| **TEXTBOOK** | | | | Konuk, A. ve Önder, S., (1999), Maden Ekonomisi, OGÜ müh. Mim. Fak. Yayınları, Eskişehir, 1999. | | | | | |
| **SUPPORTING REFERENCES** | | | | **Yıldız, R. Ve Köse, H., (2002),** Madencilik Yatırım Projelerinin Hazırlanması, Değerlendirilmesi ve Manyezit Ocağına Uygulanması, Kütahya.  **Kahriman, A., (1993),** Maden İşletme Projeleri Hazırlama ve Değerlendirme, Cumhuriyet Üniversitesi Yayınları, No:57, Sivas. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Mining Economic, Basic Economic Concepts |
| 2 | Consumption and Demand, Production and Supply |
| 3 | Production and Cost Analysis |
| 4 | Macro Economic Concepts |
| 5 | Interest and Present Value Calculations |
| 6 | Depreciation Accounts |
| 7 | Mining Investment Decisions |
| 8 | Midterm Exam |
| 9 | Investment Profitability Analysis |
| 10 | Investment Profitability Analysis |
| 11 | Sensitivity Analysis |
| 12 | The Method of Certainty Equivalent and Risk-Adjusted Rate of Return |
| 13 | Probability Distribution Method |
| 14 | National Profitability Analysis |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [X] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

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**Date:**

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# Computer Aided Mine Design

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| **COURSE CODE** | 151718551 | **COURSE NAME** | Computer Aided Mine Design |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 2 | 0 | 4 | 4 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 20 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 50 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | With this course, the usage of the main modules of integrated mining programs called as MineSight and Micromine will be taught to students. By using these softwares, students will learn stage of the computer aided mine design and able to design both open pit and underground mine. | | | | | |
| **COURSE OBJECTIVE** | | | | Scope of this course, it is targeted that students will learn computer aided mine design stages and design mine by using both MineSight and Micromine softwares. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students taking the course learn software especially related to underground – surface mine design and production planning programs in Mining Engineering. | | | | | |
| **COURSE OUTCOMES** | | | | Learning computer aided mine design stages,  Ability to design computer based open pit mine,  Ability to design computer based underground mine,  Ability to easily learn different integrated mining software. | | | | | |
| **TEXTBOOK** | | | | Anonymous, (2011), Introduction to MineSight for Geology-3D Block Modelling, MINTEC, Student Version. | | | | | |
| **SUPPORTING REFERENCES** | | | | Anonymous (2011), Lecture Notes of Surface Mining, Colorado School of Mines, Colorado, USA.  Anonymous, (2011), Introduction to MineSight Engineering – Underground Design and Scheduling, MINTEC, Student Version. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show, MineSight software. | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Project initialization, Drillhole data preparation, Importing drillhole data into softwares |
| 2 | Loading drillhole data, Displaying drillhole data in softwares, Importing contours into softwares, Creating a surface from contours |
| 3 | Bench compositing, Calculate composite statistics, Inverse Distance Weighting Interpolation, Displaying the Block Model |
| 4 | Calculating Block Model Statistics, Plot a Block Model Bench Map, Pit Limits Using the Floating Cone Algorithm, Plot the Floating Cone Pit Limits |
| 5 | Create Sections of the Pit Limit and Topography, Reserve Calculation, |
| 6 | Pit Limits Using the Lerchs and Grossman Algorithm, Display of pit in MineSight 3D |
| 7 | Pit Design, Calculate Pit Reserves, Waste Dump Design, Calculate the Volume of the Waste Dump |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Introduction to Computer Aidet Underground Design, Introduction to the software interfaces; Working with Geometry Objects and Elements; Working with Materials |
| 11 | Working with Grid Sets and the Edit Grid; Working with Point Data; Working with Polyline Data, Triangulating Data; Working with Surface Data; Designing Drillholes; Displaying Drillholes in softwares |
| 12 | Creating 3D Underground Data from Survey Data; Texturing a Surface; Face Mapping, Designing Primary Underground Development; Finding the Distance Between Elements |
| 13 | Producing a Shell Report; Scheduling Developments in Autoslicer; Producing a Fence Diagram; Linking Ore Polygons, Designing Stopes from the Orebody; Designing a Block Caving Layout |
| 14 | Designing a Room and Pillar Layout; Designing Ring Drilling, Coding Model; Calculating Model Item Values; Calculating Reserves |
| 15,16 | FINAL EXAM |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [x] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [x] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [x] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [x] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

**Date:**

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# Occupational Health and Safety II

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| **COURSE CODE** | 151718552 | **COURSE NAME** | Occupational Health and Safety II |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 2 | | 0 | 0 | 2 | 3 | COMPULSORY(X) ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The technical term for the sector,  OHS regulations in the mining workplaces,  Dust problems and fighting methods,  Occupational diseases; definition, classification, statistical information, causes, treatment and prevention,  Actions to be taken before and after emergency situations  Risk assessment regulation,  Risk assessment in the sector,  Accidents and proposed solutions in the workplace | | | | | |
| **COURSE OBJECTIVE** | | | | The main objective of the course is to teach measures to be taken against work accidents and the general and special rules related to occupational health and safety that could be encountered in the mining. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To protect human health and provide the safety knowing precautions against the possible accidents and occupational diseases in the mining workplaces | | | | | |
| **COURSE OUTCOMES** | | | | 1. The skills to learn the technical term in the sector  2. Ability to take precautions and prediction of work accidents in mining workplaces  3. Learning the effect on human health of the hazards within the working environment  4. Ability to make risk assessment  5. Ability to interpretation the accidents statistics  6. Ability to make the emergency plan  7. Ability to take legal precautions in terms of occupational security  8. Ability to make analysis and interpretation of the accidents that occurred in Turkish mining sector. | | | | | |
| **TEXTBOOK** | | | | 1. Regulation on Occupational Health and Safety in Mining workplaces  2. Regulation on Fighting Against Dust  3. Social Security Institution (www.sgk.gov.tr)  4. Risk Assessment Regulation  5. Regulation on Emergency Situations in Workplaces | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Meet and overview to the subject |
| 2 | The technical term for the sector, |
| 3 | OHS regulations in the mining workplaces |
| 4 | OHS regulations in the mining workplaces |
| 5 | OHS regulations in the mining workplaces |
| 6 | Dust problems and fighting methods |
| 7 | Occupational diseases |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Actions to be taken before and after emergency situations |
| 11 | Risk assessment regulation |
| 12 | Risk assessment regulation |
| 13 | Risk assessment in the sector |
| 14 | Accidents and proposed solutions in the workplace |
| 15,16 | FINAL EXAM |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [X] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Solid-Liquid Separation

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| **COURSE CODE** | 151718553 | **COURSE NAME** | Solid-Liquid Separation |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Fundamentals of dewatering, sedimentation; coagulation and flocculation, gravity sedimentation and equipment, thickener design, centrifugal sedimentation, filtration and filters, advanced filtration-membrane filtration, drying | | | | | |
| **COURSE OBJECTIVE** | | | | 1. The importance of the solid liquid separation in mineral processing, Principles of employed techniques and processes design, 2. Information on advanced separation methods-membrane filtration in mineral processing and waste management. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To provide handling of solid liquid techniques for the mineral processing applications. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Understanding the role of dewatering techniques in mineral processing and metallurgical Industry 2. Understanding of the basic fundamentals of separation methods, 3. Ability of the selection of appreciate methods and process design | | | | | |
| **TEXTBOOK** | | | | Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Ipekoğlu Ü., (1994) “Cevher Hazirlama El Kitabi” Editör; G. Önal G. Ateşok Yurt Mad..Gel. Vak. Istanbul 2. Scott K., Hughes R., (1996) “Industrial Membrane Separation Technology” Blackie Academic& Professional, London 3. Wills, B., (1988) “Mineral Processing Technology” Pergomon Press-London UK | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer and data show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Fundamentals of solid/liquid separation |
| 2 | The equilibrium on mineral suspensions, introduction to sedimentation, principles of free and hindered setting |
| 3 | Coagulation. General principles and application |
| 4 | Flocculation. General principles and application |
| 5 | Gravity sedimentation and thickener type, thickener design |
| 6 | Filtration |
| 7 | Filtration |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Filtration |
| 11 | Membrane filtration |
| 12 | Membrane filtration |
| 13 | Drying |
| 14 | Drying |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [x] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mineral Processing Plants

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| **COURSE CODE** | 151718554 | **COURSE NAME** | Mineral Processing Plants |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 4 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 40 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | General info about mineral processing plants such as mineral processing methods, flow sheets, mineral processing equipments used, working conditions, discussion of success and failures, suggestions. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to: visit mineral processing plants near to Eskisehir by this way students are able to see their theoretical knowledge in practice. As a result of this they are able to comment about visited plants. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students can work in mineral processing plants after taking this lesson. | | | | | |
| **COURSE OUTCOMES** | | | | See most of the mineral processing equipments in practice.  See working conditions of plants and their colleagues.  Comment about what they see in practice | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Önal, G., Ateşok., G. Ed. (1994). Cevher Hazirlama El Kitabi, Istanbul 2. Özdağ, H. (1993). Cevher Hazirlama I, Eskişehir 3. Önal, G. (1980). Cevher Hazirlamada Flotasyon Dişindaki Zenginleştirme Yöntemleri, Istanbul 4. Atak, S. (1974). Flotasyon Ilkeleri ve Uygulamasi, Istanbul 5. Aytekin, Y. (1980). Cevher Hazirlama Liç Yöntemleri, Izmir | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Seydişehir Aluminium Plants |
| 2 | Seydişehir Aluminium Plants |
| 3 | Seydişehir Aluminium Plants |
| 4 | Kirka Tincal Plants |
| 5 | Kirka Tincal Plants |
| 6 | Tunçbilek Coal Plants |
| 7 | Tunçbilek Coal Plants |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Kavak Crom Plants |
| 11 | Kavak Crom Plants |
| 12 | MAŞ Magnezite Plants |
| 13 | MAŞ Magnezite Plants |
| 14 | General evaluation of subjects |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [x] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [X] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [x] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mineral Processing Plant Design

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| **COURSE CODE** | 151718555 | **COURSE NAME** | Mineral Processing Plant Design |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Classification of mine deposits and operability, mining operations classification, flowsheet components, feasibility reports, plant economics, crushing-grinding plant design, screen sizing, hydrocyclone selection and sizing, classification principles, concentration plant designs and smelter contrats. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of this course sizing and selection of main mineral processing equipments for proper flowsheets. Overall plant costs are calculated using cost indexes. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Mineral Processing Plant Design course is a selective course for Mining Engineering students for specialing in Mineral Processing. For newly established and existing plants flowsheet development, sizing and selection of all equipments and cost estimatiom are the main gains for students. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Reserves, potentials and operability of mining deposits. 2. Before, during and after mining operations. 3. Flowsheet development components. 4. Feasibility report preparation. 5. Crushing flowsheet development, sizing and equipment selection. 6. Grinding flowsheet development, sizing and equipment selection. 7. Hydrocyclone classification, sizing and selection. 8. Clasification principles. 9. Mineral concentration flowsheets. 10. Smelter contrats. | | | | | |
| **TEXTBOOK** | | | | Kaya M. (2005), Cevher Hazirlama Tesis Proje Ders Notlari, Eskişehir. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Basics in Mineral Processing, Products Handbook, Metso Minerals. 2. M. Canbazoğlu, Y: Cebeci, N. Aslan, Cevher Hazirlama-Zenginleştirme Problemleri ve Çözümleri,Cumhuriyet Üniversitesi, 1992. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Mining deposits, operability rules and mining operations |
| 2 | Flowsheet components and feasibility reports preparation |
| 3 | Plant economics and cost estimation endexes |
| 4 | Classification of crushing flowsheets, sizing and equipment selection. |
| 5 | Classification of crushing flowsheets, sizing and equipment selection. |
| 6 | Classification of grinding flowsheets, sizing and equipment selection. |
| 7 | Classification, selection and sizing of screens. |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Classification , sizing and selection of hydrocyclones. |
| 11 | Classification principles and problems |
| 12 | Concentration flowsheets |
| 13 | Smelter contrats |
| 14 | Problem solutions |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [X] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [X] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [X] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [X] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Chemical Mining

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| **COURSE CODE** | 15178556 | **COURSE NAME** | Chemical Mining |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Solution chemistry, structure of minerals and water, elementary concepts of acid and bases, oxidation and reduction, leaching reagents, methods and equipment, systematic description the different leaching processing, treatment of leach solution by precipitation ion exchange, adsorption and solvent extraction of metals. | | | | | |
| **COURSE OBJECTIVE** | | | | General information on the principles of solution chemistry,  Understanding of the fundamentals of leaching techniques employed in mineral processing,  Learning of the selection criteria of employed techniques and processes design,  Information on separation methods used for the treatment of leach solutions-. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To provide the usability of chemical beneficiation techniques for the mineral processing applications. | | | | | |
| **COURSE OUTCOMES** | | | | Understanding of the role of hydrometallurgical methods in Mineral and Metallurgical Industry  Ability of the selection of appreciate treatment methods and process design | | | | | |
| **TEXTBOOK** | | | | Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Habashi F., (1993) “A Text Book of Hydrometallurgy” Metallugie Extractive Quebec.ENR. Canada 2. Sohn Y.H., Wadswordth M., (1993) “Rate Process of Extractive Metallurgy” Plenum Pres London- 3. Bayraktar I., (1995) “Cevherden Altin Üretim Teknolojisi” Türkiyede Altin Madenciliği Edt:Önal.G., Yüce,A.E., Karahan, S. Yurt madenciliğini geliştirme vakfi-Istanbul | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer and data show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to hydrometallurgy ,Solution chemistry |
| 2 | Leaching agent |
| 3 | Methods and equipment, the role of microorganisms on mineral beneficiation |
| 4 | Leaching process / Metals / Gold and Silver |
| 5 | Leaching process / Metals / Nickel |
| 6 | Leaching process/ Oxides and Hydroxide / Bauxite, Bayer process |
| 7 | Leaching process/ Oxides and Hydroxide / Zinc |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Leaching process/ Oxides and Hydroxide / Ilmenite |
| 11 | Leaching process /Sulfides |
| 12 | Leaching process /Sulfides |
| 13 | Treatment of leach solution / chemical precipitation |
| 14 | Treatment of leach solution / ion exchange, adsorption |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [x] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Gemstones and Works

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| **COURSE CODE** | 151718557 | **COURSE NAME** | Gemstones and Works |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 25 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 10 | |
| Project | | | 1 | 15 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Definition of gemstones. Classification of gemstones. Identification of gemstones. Precious gemstones. Semi-Precious gemstones. Occurrence of gemstones. Gemstones mining and laws. Preparation of gemstones for works. Gemstones working methods. Gemstones working Techniques. Gemstones working tools. Works of gemstones: Grinding, sanding, tumbling, polishing, kabachon, bead, sawing, drilling, painting. | | | | | |
| **COURSE OBJECTIVE** | | | | 1. Importance of gemstones for mining sector. 2. Learning the occurrence of gemstones. 3. training persons for gemstones sector. 4. Learning to works techniques for gemstones. 5. Learning gemstones utilization 6. Application of quality control for mining system. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | A geologic discovery of a mine deposit and it is ready for production in an operating mine. | | | | | |
| **COURSE OUTCOMES** | | | | Evaluation of gemstones of occurrence in Turkey | | | | | |
| **TEXTBOOK** | | | | Bozkurt, R.. Hatipoğlu, M.. Ankara, H.. ve Özkar, D. (2006). Süs Taşlari ve işleme teknikleri, Eskişehir | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show, gemstone machineries | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Definitions and concepts for gemstones. |
| 2 | Classification of gemstones |
| 3 | Gem identifications |
| 4 | Precious gems |
| 5 | Precious gems |
| 6 | Semi precious gems |
| 7 | Semi precious gems |
| 8 | Semi precious gems |
| 9 | The methods of gems works |
| 10 | The methods of gems works |
| 11 | The methods of gems works |
| 12 | Midterm |
| 13 | The methods of gems works |
| 14 | The methods of gems works |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [x] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [X] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

**Date:**

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# Agglomeration

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| **COURSE CODE** | 151718558 | **COURSE NAME** | Agglomeration |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 3 | | 0 | 0 | 3 | 4 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Agglomeration: Importance and aim of agglomeration, Tests applied to agglomerates, Strength of agglomerates, Mechanism of agglomeration and effective forces in agglomeration, Agglomeration methods  Briquetting of coal: Objectives and tests applied to briquettes, Briquetting without binder, Briquetting with binder  Pelletizing and sintering | | | | | |
| **COURSE OBJECTIVE** | | | | Mechanism of agglomeration, methods used to produce agglomerates and physical and chemical properties of produced agglomerates are taught to students | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To give information to students about briquetting of coals, pelletizing and sintering of iron ores. | | | | | |
| **COURSE OUTCOMES** | | | | Students can work in iron and steel industry, fertilizer industry, pharmacology industry and etc., that use agglomeration techniques after taking this lesson. | | | | | |
| **TEXTBOOK** | | | | Kemal, Mevlüt, 1990, ‘Agglomerasyon’, Dokuz Eylül Üniversitesi Mühendislik-Mimarlik Fakültesi MM/MAD – 90 EY 041, Izmir. | | | | | |
| **SUPPORTING REFERENCES** | | | | <http://bepex.com/web/bepex/AGLM%20METHODS%20EQUIP.PDF>, <http://bepex.com/web/bepex/INSTANT.PDF> <http://bepex.com/web/bepex/EXTRUSION.PDF>  <http://rennes.inra.fr/spray/spray_conf/26_mak1.pdf>  <http://vt1.tu-harburg.de/Praktikumsanleitungen/agglomeration.pdf> | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Agglomeration: Importance and aim of agglomeration, Tests applied to agglomerates, Strength of agglomerates |
| 2 | Mechanism of agglomeration and effective forces in agglomeration |
| 3 | Mechanism of agglomeration and effective forces in agglomeration |
| 4 | Agglomeration methods, Briquetting of coal: Objectives and tests applied to briquettes, Binderless briquetting |
| 5 | Binderless briquetting |
| 6 | Binderless briquetting |
| 7 | Briquetting with binder |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Briquetting with binder |
| 11 | Briquetting with binder |
| 12 | Pelletizing |
| 13 | Pelletizing |
| 14 | Sintering |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Innovation and Entrepreneurship

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| **COURSE CODE** | 151718559 | **COURSE NAME** | Innovation and Entrepreneurship |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 2 | | 0 | 0 | 0 | 2 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Innovation and entrepreneurship Concept and Scope, Innovation and Science, Importance and Impact of Innovation on Business, Entrepreneurship and Leadership, also Could anyone Entrepreneur? And Success Factors of Entrepreneurship. | | | | | |
| **COURSE OBJECTIVE** | | | | To learn the importance of entrepreneurship and innovation In providing awareness and sustainability and in being successful in business. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Innovation and entrepreneurial activities will be required to be successful in future work life, therefore to learn the basics of entrepreneurship and to recognize their skills in this area. | | | | | |
| **COURSE OUTCOMES** | | | | It is aimed that students;   * Learn the concepts and scope of Innovation and entrepreneurship, * Understand the importance of entrepreneurship and innovative thinking and effect. * Win Systematic thinking skills, * learn the importance of innovation and entrepreneurial activity in sense of technical, economic, social and political. | | | | | |
| **TEXTBOOK** | | | | Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | Ramazan YILDIRIM, *Yaratıcılık ve Yenilik*, Sistem Yayıncılık, 4. Baskı, 2003. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction and Basic Concepts, |
| 2 | What is Innovation and Entrepreneurship? |
| 3 | Innovation and Science, |
| 4 | İnnovation Types and Sources, |
| 5 | Innovation and Strategy, |
| 6 | Innovation and Management, |
| 7 | Impact and Importance of Innovation on Businesses, |
| 8 | Mid-Term Examination 1 |
| 9 | Mid-Term Examination 1 |
| 10 | Entrepreneurship Concept and Scope, |
| 11 | Entrepreneurs Features and Types, |
| 12 | Entrepreneurial Culture and Ethics, |
| 13 | Entrepreneurship and Leadership, |
| 14 | Could anyone Entrepreneur? Success Factor, |
| 15,16 | FINAL EXAM |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [ ] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [X] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [X] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [X] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Project and Risk Management

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| **COURSE CODE** | 151718560 | **COURSE NAME** | Project and Risk Management |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 2 | | 0 | 0 | 0 | 2 | COMPULSORY() ELECTIVE() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | |  | | | | X | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The definition of project and project management, Gantt charts , project management with CPM and PERT techniques , project resources and costs , risk analysis and assessment methods, risk analysis, management and project completion reports. | | | | | |
| **COURSE OBJECTIVE** | | | | To explain the project management and the risk management concepts and techniques, to teach how a project would be completed by what means and methods, to teach the worker’s responsibilities who are working in a project. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | - To develop a project planning and execution skills.  - Gain the ability to analyze risk.  - To acquire the ability to see the potential risks in the workplace. | | | | | |
| **COURSE OUTCOMES** | | | | - To learn project preparation, execution and completion methods.  - To understand the ways and methods of risk management in project preparation.  - To learn how to solve engineering problems to be taken against the risks that may occur within the scope of a project. | | | | | |
| **TEXTBOOK** | | | | **Lecture notes.** | | | | | |
| **SUPPORTING REFERENCES** | | | | Project Management 3rd Edition., Rory Burke, 1999, Wiley. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Project and project management concepts |
| 2 | Components of Project Management and Project Manager |
| 3 | Project Planning (Gantt, |
| 4 | Project Planning ( PERT and CPM), |
| 5 | Resource and Cost Planning, |
| 6 | Execution of the project, |
| 7 | Risk Management and Its Types |
| 8 | Mid-Term Examination |
| 9 | Mid-Term Examination |
| 10 | Evaluation of Risk ( identification, analysis and priorities) and Counter Planning |
| 11 | Tools and Techniques of Risk Management |
| 12 | Project Monitoring, Reporting, Audit and Control |
| 13 | Project Monitoring, Reporting, Audit and Control |
| 14 | Completion of the project |
| 15,16 | FINAL EXAM |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | [ ] | [X] | [ ] |
| 3 | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [ ] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility | [ ] | [ ] | [x] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [X] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Mine Development and Excavation Researches

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| **COURSE CODE** | 151718520 | **COURSE NAME** | Mine Development and Excavation Researches |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 40 | |
| **FINAL EXAM** | | | | Committee | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The main aim of the course is to learn mine development and excavation before the production in ore deposits. Course content: Mine surveying. Sampling methods. Basic physical and mechanical properties of rocks and excavation techniques. Application of mechanization in the excavation of coal mines. Explosives used in mines and its properties. Drilling with machine and manuel. Selection of shaft area and design. Deeping of shafts. Drivage of horizontal openings. Blasting. Occupational health and safety analysis and measures in the all process. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to do research on a predetermined subject related mine development and excavation applications in mining, and to present. Identify the hazards and risks encountered in these works and teaching the measures must be taken. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Gain the ability of preparing projects about the mine development and excavation before the production in ore deposits and about measures for occupational health and safety in underground and opencast mines. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn the mine surveying.  2. Learn the sampling methods.  3. Learn the application of mechanization in the excavation of coal mines.  4.Learn the explosives used in mines and its properties  5. Learn the drilling with machine and manuel.  6. Learn the selection of shaft area and design  7. Identify, formulate and solve engineering problems.  8. Perform literature search on the related subject in digital databases, libraries and thesis.  9. Know how to develop an individual project.  10. Use office programs, such as MS Word, Excel and PowerPoint, to prepare and present finishing project.  11. Editing the graduation thesis on the computer, by taking attention to the rules of writing  12. Translation to Turkish of scientific articles that are written in a foreign language related to the subject | | | | | |
| **TEXTBOOK** | | | | **1. Saltoğlu, S., (1982),** Madenlerde Hazirlik ve Kazi Işleri I.T.Ü. Vakfi Yayinlari, Istanbul  **2. Arioğlu, E., (1985),** Çözümlü Madencilik Problemleri, Prof.Dr. Ergin ARIOĞLU, T.M.M.O.B. Maden Mühendisleri Odasi Yayini, Ankara  **3. Onika, D., (1972),** Excavation of Mine Openings, Mir Publishers Moscow. | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Presentation of the mine development and excavation |
| 2 | Presentation of the mine development and excavation |
| 3 | To give hazard and risk factors encountered in these works |
| 4 | Explanation of occupational accidents and diseases encountered in this process |
| 5 | Explanation of occupational accidents and diseases encountered in this process |
| 6 | Starting a work on a current topic related to mine development and excavation |
| 7 | Detailing of the study on the work. |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Detailing of the study on the work. |
| 11 | Detailing of the study on the work. |
| 12 | Studies of making the original report on the research subject. |
| 13 | Studies of making the original report on the research subject. |
| 14 | Studies of making the original report on the research subject. |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [X] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [X] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Rock Mechanic Researches

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| **COURSE CODE** | 151718521 | **COURSE NAME** | Rock Mechanic Researches |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Content of the course is as follows: searching for books and papers about the subject; field observations and measurements; practice of decided laboratory tests, writing report of the study and oral presentation. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to do research on a predetermined subject related mining application, and to present prepared report before a jury. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The main aim of the course is to give ability of personal studying on a given subject. | | | | | |
| **COURSE OUTCOMES** | | | | To learn how to do literature survey.  Ability of doing field observations and measurements.  To learn how to design an experimental layout.  To prepare a final report.  Give a presentation.  To learn how to do a personal study on a subject. | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | Books and papers about the subject. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | General review of mine subjects, |
| 2 | Literature research on a given mine subject, |
| 3 | Continue for searching, |
| 4 | Compilation of the literature work, |
| 5 | Continue for compilation, |
| 6 | Field observations and measurements; laboratory tests, |
| 7 | Field observations and measurements; laboratory tests, |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Field observations and measurements; laboratory tests, |
| 11 | Research on applications in Turkey, |
| 12 | Research on applications on the world, |
| 13 | Writing report, |
| 14 | Writing report, |
| 15,16 | Preparing presentation. |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [X] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [x] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Pelletizing Analysis

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| **COURSE CODE** | 151718522 | **COURSE NAME** | Pelletizing Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Explanation of pelletizing that is one of the size enlargement methods and application techniques. Having the students gain laboratory experience by applying pelletization on a selected ore mineral. Preparation of a detailed final report by literature survey. | | | | | |
| **COURSE OBJECTIVE** | | | | The main purpose of the course is to have the students gain the ability to prepare a scientific report or project by investigating a subject related with mine operations. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Gaining detailed information about pelletizing. Gaining ability to prepare a detailed report by means of collecting theoretical knowledge and application.  Gaining laboratory study experience by performing a full laboratory study, starting from size reduction. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn the rules which should be paid attention while preparing scientific document or project. 2. Perform literature search on the related subject either in digital databases or libraries. 3. Gaining the knowledge about the subject to be applied 4. Gaining a detailed literature knowledge of mineralogical structure, reserve and commercial importance of selected ore mineral 5. The investigation mineral processing method to be applied to selected ore mineral. 6. Compose the finishing project on the computer by considering the preparation format. 7. Search for the finishing project, master of science/philosophy of doctoral thesis done before. 8. Information about presentation techniques. 9. Present the prepared finishing project by using MS Powerpoint. | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | Books, scientific journal/periodical/magazine, thesis, databases subscribed by ESOGÜ University, etc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Pre-investigation to determine the subject |
| 2 | Selection of the research subject and starting to survey the literature |
| 3 | Sample preparation and literature survey |
| 4 | Sample preparation and literature survey |
| 5 | Assessment |
| 6 | Sample preparation and literature survey |
| 7 | Sample preparation and literature survey |
| 8 | Experimental studies and preparation of the report about literature survey |
| 9 | Experimental studies and preparation of the report about literature survey |
| 10 | Experimental studies |
| 11 | Analyzing the results of experimental studies |
| 12 | Analyzing the results of experimental studies and reporting |
| 13 | Analyzing the results of experimental studies and reporting |
| 14 | Assessment of final report |
| 15,16 | Final evaluation |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Coal Technology Researches

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| **COURSE CODE** | 151717523 | **COURSE NAME** | Coal Technology Researches |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 25 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | | 1 | 25 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to Coal Technology, General Knowledge about Coal Utilization; Determination of practical Work; Literature Survey; Set of Laboratory Equipment; Laboratory Studies. | | | | | |
| **COURSE OBJECTIVE** | | | | This course focuses on teaching the principle and application of coal technology in coal utilization. Basic principles of this course are to research on a predetermined subject, to prepare a report about it and to submit this report to a jury. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | This course contributes to the coal technology sector by trying to solve the problems encountered in the field of coal preparation plants. | | | | | |
| **COURSE OUTCOMES** | | | | To learn how to do literature survey.  To give necessary knowledge for selection of appropriate methods for coal utilization  Usage of the selected methods in the laboratory scale and result evaluation.  To use techniques, skills, and modern engineering tools necessary for mining engineering practice  To learn how to design an experimental layout  To prepare a final report and to submit | | | | | |
| **TEXTBOOK** | | | | Sinclair, J. (1962) Coal Preparation and Power Supply at Collieries, Sir Isaac Pitman & Sons Ltd., Londan, UK | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Önal, G. & G. Ateşok (1997) Kömür Teknolojisi Kullanim Semineri I-II-III-IV-V. Istanbul:Yurt Madenciliğini Geliştirme Vakfi. 2. Kural, O. (2000) Kömür: Kimyasi ve Teknolojisi., Güney Grafik, Istanbul.. 3. Liu, Y.A. (1982) Physical Cleaning ofCoal. Marcel Dekker, Inc., New York, USA. 4. Khoury, D.L. (1981) Coal Cleaning Technology. Noyes Data Corp., New Jersey, USA. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Processing and analysis equipment in mineral processing laboratory | | | | | |

|  |  |
| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to Coal Technology |
| 2 | General Knowledge on Coal Utilization |
| 3 | Subject determination for practical study and planning |
| 4 | Flotation machines |
| 5 | Literature survey |
| 6 | Literature survey |
| 7 | Evaluation of literature survey |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Practical work |
| 11 | Practical work |
| 12 | Practical work |
| 13 | Evaluation of practical work |
| 14 | Submission and evaluation of final report |
| 15,16 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [x] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Crushing-Grinding Analyses

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| **COURSE CODE** | 151718524 | **COURSE NAME** | Crushing-Grinding Analyses |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 30 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | | 1 | 20 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | | Board | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | | Seventy-five percent of the total credit amount to be achieved must be completed | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to comminution, The importance of crushing and grinding in ore preparation, Principles of comminution, Comminution theories, Crushers, Crushing circuits and theirs controls, Mills, Grinding circuits and theirs controls, Crushing and grinding plant design applications. | | | | | |
| **COURSE OBJECTIVE** | | | | To do a narrow-scoped research on a topic to be determined, Prepare a report on the results of research and submission of the report prepared in front of the board. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | * Make a literature survey, * Learn the basic principles of Crushing-Grinding process, * Deciding how to select the device that is used in the process, * An experimental study design and its application, * Prepare a report on the results of this study and submit. | | | | | |
| **TEXTBOOK** | | | | * Barry A. Wills, 1997, Mineral Processing Technology, Sixth Edition, Butterworth-Heinemann | | | | | |
| **SUPPORTING REFERENCES** | | | | * Hoşten, Ç., 2002, Cevher Hazirlama ve Zenginleştirme Temel Işlemlerinin Tasarimi, ODTÜ Maden Müh. Böl., Ankara. * Yildiz, N., 1999, Öğütme Teorisi, Uygulamasi-Seğirmenler ve Siniflandiricilar, Ankara. * Abouzeid, A.Z.M., 1990, Mineral Processing Laboratory Manuel, Trans. Tech. Publications. * Özdağ, H., 1992, Cevher Hazirlama-I, Anadolu Üniversitesi Müh. Mim. Fak. Yayinlari, No. 107, Eskişehir. * Akar, A., 1985, Cevher Hazirlama Tesis ve Dizayni, Dokuz Eylül Üniversitesi Müh. Mim. Fak., MM/Mad-85 EY 01, Izmir. * Özensoy, E., 1982, Teknolojik ve Bilimsel Araştirmalarda Modern Deney Tasarimciliği ve Optimizasyon Yöntemleri, MTA Yayinlari, No :24, Ankara. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Calculator, Computer | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Determining the guidelines for project work |
| 2 | Introduction to comminution |
| 3 | Explaining the importance of comminution in mineral processing |
| 4 | Comminution theories |
| 5 | Project work |
| 6 | Types of Crushers, crushing circuits and theirs controls |
| 7 | Types of Mills, Grinding circuits and theirs controls |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Display of the application fields of the crushers |
| 11 | Display of the application fields of the mills |
| 12 | Project work |
| 13 | The basic principles of Crushing-Grinding plant design |
| 14 | Preliminary assessment of the resulting project work and report |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [X] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Underground Mining Analysis

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| **COURSE CODE** | 151718525 | **COURSE NAME** | Underground Mining Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | | Committee | | |  |  | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Basic concepts of underground mining, underground mining design with software, project preparation, support and pillar concepts, underground mining methods and selection, basic principles of tunneling, tunnel support design, numerical modelling, mine design and numerical modelling software | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to design underground mines and tunnels by using computer software, and also to analyze underground mines and tunnels in terms of stability by using numerical modelling methods. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Gain the ability of designing and analyzing the underground mines and tunnels | | | | | |
| **COURSE OUTCOMES** | | | | 1. To be able to use underground mine design software.  2. Learn the computer aided design.  3. Know how to develop an individual project.  4. To be able to use numerical modelling software.  5. To use numerical modelling software to analyze tunnels.  6. Learn how to analyze stability of underground mines and tunnels.  7. Perform literature search on the related subject either in digital databases or libraries.  8. Use office programs, such as MS Word, Excel and Powerpoint, to prepare and present finishing project. | | | | | |
| **TEXTBOOK** | | | | Minesight course notes, Phases and Flac3d manual | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer and software | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Basic concepts of underground mining |
| 2 | Underground mining design with software |
| 3 | Underground mining design with software |
| 4 | Minesight sofware |
| 5 | Basic principles of tunneling |
| 6 | Tunnel support design with software |
| 7 | Numerical modelling |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Phases and Flac3d software |
| 11 | Detailing of the study on the work. |
| 12 | Detailing of the study on the work. |
| 13 | Studies of making the original report on the research subject. |
| 14 | Studies of making the original report on the research subject. |
| 15,16 | FINAL EXAM |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [x] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Solid-Liquid Analysis

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| **COURSE CODE** | 151718526 | **COURSE NAME** | Solid-Liquid Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 20 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Process design and evaluation of test results. | | | | | |
| **COURSE OBJECTIVE** | | | | The objective of the course is gaining the ability of understanding of the importance of the solid liquid separation in mineral processing, designing of the experimental set-up or research schedule and results evaluation. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Theatrical or practical information on the application of solid-liquid separation methods. | | | | | |
| **COURSE OUTCOMES** | | | | Understanding the role of dewatering techniques in mineral processing and metallurgical Industry  Understanding of the basic fundamentals of separation methods,  Ability of the selection of appreciate methods, process design and result evaluation | | | | | |
| **TEXTBOOK** | | | | Course notes | | | | | |
| **SUPPORTING REFERENCES** | | | | * Ipekoğlu Ü., (1994) “Cevher Hazirlama El Kitabi” Editör; G. Önal G. Ateşok Yurt Mad..Gel. Vak. Istanbul * Scott K., Hughes R., (1996) “Industrial Membrane Separation Technology” Blackie Academic& Professional, London * Wills, B., (1988) “Mineral Processing Technology” Pergomon Press-London UK | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Fundamentals of solid/liquid separation |
| 2 | Subject determination for practical or theoretical study and planning |
| 3 | Literature survey |
| 4 | Literature survey |
| 5 | Literature survey |
| 6 | Midterm Exam |
| 7 | Practical work or compile a report |
| 8 | Practical work or compile a report |
| 9 | Practical work or compile a report |
| 10 | Practical work or compile a report |
| 11 | Practical work or compile a report |
| 12 | Home work submission |
| 13 | Discussion and report writing |
| 14 | Report writing |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [x] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

**Date:**

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# Mine Transportation Analysis

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| **COURSE CODE** | 151718527 | **COURSE NAME** | Mine Transportation Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 2 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | | 75% of total credits must be accomplished | | | | | |
| **SHORT COURSE CONTENT** | | | | Subsystems of transportation in mines, Transportation via gravity, Swinging Conveyor, Chain Conveyors, Belt Conveyors, Railway Transportation, Transportation by Locomotives, LHD, Transportation by Ropeway, Transportation of Pipelines, Personnel Transportation in Underground Mines, Water drainage in Mines | | | | | |
| **COURSE OBJECTIVE** | | | | To teach the transportation system calculations. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The students can make related calculation | | | | | |
| **COURSE OUTCOMES** | | | | Ability to select optimum transportation system.  Ability to perform calculations of related transportation system.  Ability to design transportation project. | | | | | |
| **TEXTBOOK** | | | | 1. Önce, G., (1992). “Madenlerde Ulaşim ve Su Atimi”, Eskişehir Osmangazi Üniversitesi Mühendislik-Mimarlik Fakültesi Yayinlari. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Şimşir, F., Tatar, Ç. ve Özfirat, K., (2002). “Madenlerde Nakliyat”, 9 Eylül Üniversitesi Mühendislik Fakültesi Yayinlari, No: 296, Izmir. 2. Erdem, Bülent, “Nakliyat ve Su Atimi”, Cumhuriyet Üniversitesi Maden Mühendisliği Bölümü, Yayimlanmamiş Ders Notlari. 3. Uğur, Ismail, “Madenlerde Ulaşim ve Su Atimi”, Istanbul Teknik Üniversitesi, Yayimlanmamiş Ders Notlari. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | General review of mine transportation subjects, |
| 2 | Literature research on a given mine transportation subject, |
| 3 | Continue for searching, |
| 4 | Compilation of the literature work, |
| 5 | Continue for compilation, |
| 6 | Field works |
| 7 | Field works |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Field works |
| 11 | Field works |
| 12 | Field works |
| 13 | Writing report |
| 14 | Preparing presentation |
| 15,16 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [X] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

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**Date:**

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# Mine Ventilation Researches

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| **COURSE CODE** | 151718528 | **COURSE NAME** | Mine Ventilation Researches |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 40 | |
| **FINAL EXAM** | | | | Committee | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The concept of ventilation in underground mines, the definition of pollutants in mine air, computer aided ventilation design, prepare of project, psychometric calculations, risk analysis in mining, health and safety, the research of ventilation systems in underground mines. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to explain of underground ventilation network and computer programs related to ventilation. In addition, occupational health and safety in mining industry is explained. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Gain the ability of preparing projects about the mine ventilation one of the main parameters effect on the design of occupational health and safety in underground mines. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn how to study of mine ventilation network.  2. Learn the computer aided design.  3. Know how to develop an individual project.  4. Learn the risk factors in mining.  5. Learn the safety precaution in underground mines.  6. Learn how to analyze the pollutants in mine air.  7. Learn how to use the psychometric.  8. Perform literature search on the related subject either in digital databases or libraries.  9. Use office programs, such as MS Word, Excel and Powerpoint, to prepare and present finishing project. | | | | | |
| **TEXTBOOK** | | | | 1. McPherson, M.J. (1993). Subsurface Ventilation and Environmental Engineering. | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Hartman, H.L (1991). Mine Ventilation and Air Conditioning. 2. Önce,G., & Saraç,S. (1986). Madenlerde Havalandirma 3. Güyagüler, T., Karakaş, A.,& Güngör, A. (2005). Occupational Health and Safety in Mining Industry. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

|  |  |
| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Presentation of the underground mine ventilation |
| 2 | Presentation of the underground mine ventilation |
| 3 | Given the issues to be considered of mine ventilation projects. |
| 4 | Presentation of computer programs related to mine ventilation. |
| 5 | Explanation of work accident related to mine ventilation. |
| 6 | To give hazard and risk factors. |
| 7 | Starting a work on a current topic related to mine ventilation. |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Detailing of the study on the work. |
| 11 | Detailing of the study on the work. |
| 12 | Studies of making the original report on the research subject. |
| 13 | Studies of making the original report on the research subject. |
| 14 | Studies of making the original report on the research subject. |
| 15,16 | FINAL EXAM |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [X] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Signature(s)**:

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# Open Pit Machines Analysis

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| **COURSE CODE** | 151718529 | **COURSE NAME** | Open Pit Machines Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 40 | |
| **FINAL EXAM** | | | | Committee | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The content of the course is as follows: Introduction to drilling machines and drilling equipment selection, calculation methods used in selection of mining machines such as truck and excavator, appropriate dragline selection considering determined bucket capacity, application of bucket wheel and bucket chain excavator in open pit mines, factors affecting the productivity and field performance of open pit machines. | | | | | |
| **COURSE OBJECTIVE** | | | | The main purpose of the course is to prepare a scientific document or project by carrying out literature search on the topic chosen from the subjects dealt with mining equipments used in open pit mines. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Gain the ability of preparing projects about the performance and efficiency analyses of various open pit mining machines. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Acquire detailed information about mining equipments used in open pit mines.  2.Comprehend the drilling, excavation and loading equipments and learn the equipment selection methods.  3.Understand the factors affecting the productivity and field performance of open pit machines.  4.Know transporting equipments in open pit mines and be able to select optimum transporting machine employing the equipment selection methods.  5.Perform literature search on the related subject either in digital databases or libraries.  6.Learn the rules which should be paid attention while preparing scientific document or project.  7.Use office programs, such as MS Word and Excel, to prepare finishing project.  8.Compose the finishing project on the computer by considering the preparation format.  9.Search for the finishing project, master of science/philosophy of doctoral thesis done before.  10.Translate the scientific articles written in foreign language into Turkish.  11.Acquire knowledge about presentation techniques.  12. Present the prepared finishing project by using MS Powerpoint. | | | | | |
| **TEXTBOOK** | | | | Eskikaya Ş, Karpuz C, Hindistan M.A, Tamzok N. “Maden Mühendisliği Açik Ocak Işletmeciliği El Kitabi”, TMMOB Maden Mühendisleri Odasi, ss 744, 2005. ISBN:975-395-980-x. | | | | | |
| **SUPPORTING REFERENCES** | | | | Books, scientific journal/periodical/magazine, thesis, databases subscribed by ESOGÜ University, etc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Open pit mining operations |
| 2 | Excavation and loading operations |
| 3 | Excavator and loader typs, Excavator and loader selection |
| 4 | Haulage method and equipment |
| 5 | Kazici - taşiyici donanim kapasite tayini |
| 6 | Drilling machines |
| 7 | Drilling machines selection |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Dragline |
| 11 | Dragline selection |
| 12 | Bucked whell excavaor selecion |
| 13 | Chain bucket excavator selecion |
| 14 | Marble machines |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [X] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Size Reduction Analysis

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| **COURSE CODE** | 151718530 | **COURSE NAME** | Size Reduction Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVEX() | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | 75% of total credits must be accomplished | | | | | |
| **COURSE OBJECTIVE** | | | | Work index, work index calculation methods, critical speed, grinding media, interfiling ratio, lifters, breakage rate, breakage distribution | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The primary aim of this course is to determine, in laboratory conditions, those parameters that are used in the design of size reduction equipments. | | | | | |
| **COURSE OUTCOMES** | | | | Characteristics of mills in mineral processing plants, steps to be followed to determine these characteristics and interpreting these results | | | | | |
| **TEXTBOOK** | | | | By the end of this module students will be able to:  Literature review  Obtain an awareness of work index and calculation methods, and be able to compare and contrast the characteristics of these methods.  Develop an ability to determine the work index of an ore using various methods and under laboratory conditions.  Determine the breakage rate and distribution parameters of an ore and the change of these parameters considering plant conditions | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | General review of size reductione subjects, |
| 2 | Literature research on a given size reduction subject, |
| 3 | Continue for searching, |
| 4 | Compilation of the literature work, |
| 5 | Continue for compilation, |
| 6 | Laboratory tests |
| 7 | Laboratory tests |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Laboratory tests |
| 11 | Laboratory tests |
| 12 | Laboratory tests |
| 13 | Writing report |
| 14 | Preparing presentation |
| 15,16 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [X] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Mining Economy Analysis

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| **COURSE CODE** | 151718531 | **COURSE NAME** | Mining Economy Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 25 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 25 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | | Committee | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Developments in raw material markets, Interest and present value calculations, Depreciation accounts, Evaluation of mining investment projects, Investment and national profitability analysis, Risk and sensitivity analysis, Preparation of mining operations and feasibility projects | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is; to teach the estimation of variables and parameters necessary for the preparation of mining operations and feasibility projects and to provide students with the ability to prepare projects. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To be able to define the problems, to analyze and evaluate the data to be carried out for the estimation of mining operation and feasibility projects data. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learning the latest developments in raw material markets. 2. To learn the concepts of interest and present value. 3. To be able to make depreciation calculations. 4. Learning the properties of mining investment projects. 5. To be able to make commercial profitability analysis. 6. To be able to make national profitability analysis. 7. To learn sensitivity analysis methods. 8. Learning risk analysis methods. 9. To learn how to prepare a mining operation and feasibility project 10. Ability to edit the thesis on the computer by paying attention to the writing format. 11. To be able to translate the scientific articles written in foreign language into Turkish. 12. To be able to present the prepared final project using MS Powerpoint | | | | | |
| **TEXTBOOK** | | | | 1. KAHRİMAN, A., 1993, Maden İşletme Projeleri Hazırlama ve Değerlendirme , Dilek Matbaası, Sivas, 2. O NEIL, T.J. , GENTRY, D.W., 1984; Mine Investment Analysis , Society of Mining Engineers, USA | | | | | |
| **SUPPORTING REFERENCES** | | | | Books, scientific journals, theses, internet databases, etc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer and package programs | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Current developments in raw materials markets |
| 2 | Current developments in raw materials markets |
| 3 | Interest and present value |
| 4 | Depreciation accounts |
| 5 | Properties of mining investment projects |
| 6 | Commercial profitability analysis |
| 7 | Commercial profitability analysis |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Sensitivity analysis methods |
| 11 | Risk analysis methods |
| 12 | National profitability analysis |
| 13 | Introducing the mining business project format |
| 14 | Introduction of feasibility project format |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems | **[ ]** | **[ ]** | **[ ]** |
| 2 | Ability to determine, define formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods | **[X]** | **[ ]** | **[ ]** |
| 3 | Ability to design a system, component, and/or engineering process to under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | **[ ]** | **[ ]** | **[ ]** |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | **[ ]** | **[X]** | **[ ]** |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | **[ ]** | **[ ]** | **[ ]** |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | **[ ]** | **[ ]** | **[ ]** |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | **[ ]** | **[ ]** | **[ ]** |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | **[ ]** | **[ ]** | **[ ]** |
| 9 | Understanding of professional and ethical issues and taking responsibility. | **[ ]** | **[ ]** | **[ ]** |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | **[ ]** | **[ ]** | **[x]** |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions | **[ ]** | **[ ]** | **[ ]** |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Mineral Classification Analysis

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| **COURSE CODE** | 151718532 | **COURSE NAME** | Mineral Classification Analysis |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 30 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | | 1 | 20 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | 75% of total credits must be accomplished | | | | | |
| **COURSE OBJECTIVE** | | | | Introduction to classification, classification principles, classification devices, comparison of classification devices and their area of use. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To give detailed information about the classification devices used in mineral processing. | | | | | |
| **COURSE OUTCOMES** | | | | Detailed knowledge about classifying devices,  Experience about how to reach information (literature search), prepare a report with information gathered and presentation of it. | | | | | |
| **TEXTBOOK** | | | | Have detailed information (principles, area of use, advantages, disadvantages etc.) about various classification devices.  Have an idea about the selection of appropriate classification device for a mineral processing plant.  To carry out research, present a report in writing and orally, | | | | | |
| **SUPPORTING REFERENCES** | | | | Wills, B. A., 1997, Mineral Processing Technology, 6th Edition. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| --- | --- |
| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to classification |
| 2 | Project study |
| 3 | Principles of classification |
| 4 | Principles of classification |
| 5 | Project study |
| 6 | Types of classifiers |
| 7 | Types of classifiers |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Application of classifiers |
| 11 | Application of classifiers |
| 12 | Project study |
| 13 | Comparison of classifiers |
| 14 | Project study |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [X] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Agglomeration Analyses.

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| **COURSE CODE** | 151718533 | **COURSE NAME** | Agglomeration Analyses |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Agglomeration: Importance and aim of agglomeration, Tests applied to agglomerates, Strength of agglomerates, Mechanism of agglomeration and effective forces in agglomeration, Agglomeration methods  Briquetting of coal, Pelletizing and sintering, Agglomeration in suspension | | | | | |
| **COURSE OBJECTIVE** | | | | Mechanism of agglomeration, methods used to produce agglomerates and physical and chemical properties of produced agglomerates are taught to students | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To give information to students about briquetting of coals, pelletizing/sintering of iron ores and agglomerations in suspension. | | | | | |
| **COURSE OUTCOMES** | | | | Students can work in ceramic industry, iron and steel industry, fertilizer industry, pharmacology industry, wastewater treatment plants and solid liquid separation plants and etc., that use agglomeration techniques after taking this lesson. | | | | | |
| **TEXTBOOK** | | | | Kemal, Mevlüt, 1990, ‘Agglomerasyon’, Dokuz Eylül Üniversitesi Mühendislik-Mimarlik Fakültesi MM/MAD – 90 EY 041, Izmir.  Bratby, Bratby, 1980, ‘Coagulation and Flocculation’, Uplands Press Publication, England, 354 p. | | | | | |
| **SUPPORTING REFERENCES** | | | | <http://bepex.com/web/bepex/AGLM%20METHODS%20EQUIP.PDF>  <http://bepex.com/web/bepex/INSTANT.PDF>  <http://bepex.com/web/bepex/EXTRUSION.PDF>  <http://rennes.inra.fr/spray/spray_conf/26_mak1.pdf>  <http://vt1.tu-harburg.de/Praktikumsanleitungen/agglomeration.pdf>  Coagulation and Flocculation, 1993, Zeta-Meter, Inc., PO Box 3008, Staunton VA 24402-3008, USA, 37 p.  Zeta Potential: A Complete Course in 5 Minutes’, Zeta-Meter, Inc., PO Box 3008, Staunton VA 24402-3008, USA, 8 p. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Importance and aim of agglomeration, Tests applied to agglomerates |
| 2 | Mechanism of agglomeration and effective forces in agglomeration |
| 3 | Agglomeration methods, Briquetting of coals |
| 4 | Binderless briquetting |
| 5 | Briquetting with binder |
| 6 | Briquetting with binder |
| 7 | Pelletizing |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Pelletizing |
| 11 | Sintering |
| 12 | Sintering |
| 13 | Agglomeration in suspension - Flocculation |
| 14 | Agglomeration in suspension - Coagulation |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [X] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [X] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Industrial Raw Materials Analyses

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| **COURSE CODE** | 151718534 | **COURSE NAME** | Industrial Raw Materials Analyses |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 20 | |
| Quiz | | |  |  | |
| Homework | | | 1 | 20 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Literature review is done about determined industrial minerals. Concentration experiments are also done. Experimental results are evaluated, reported and presented. | | | | | |
| **COURSE OBJECTIVE** | | | | To teach principles of the mineral processing techniques, properties of the devices, applications in detail for industrial and laboratory use. With a project work required, it is also aimed to learn how; to perform laboratory works, to investigate industrial plant operations and to perform literature survey. In addition, students will be able to improve their presentation skills through presenting and preparing their presentations and reports. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Students can work in mineral processing plants after taking this lesson. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn mineral processing techniques and devices used in detail. 2. Learn how to perform laboratory work and chemical analysis. 3. Improve their skills on literature surveying, report preparation and presentation. | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. Bozkurt R. (1989). Endüstriyel Hammaddeler, A.Ü. Müh. Mim. Fakültesi Yayinlari, No. 97 2. Önem Y. (1997). Sanayi Madenleri, Kozan Ofset 3. Önal, G., Ateşok., G. Ed. (1994). Cevher Hazirlama El Kitabi, Istanbul 4. Önal, G. (1980). Cevher Hazirlamada Flotasyon Dişindaki Zenginleştirme Yöntemleri, Istanbul 5. Completed theses and reports 6. National/International Mineral Processing Proceedings 7. D.P.T. Özel Ihtisas Komisyonu Raporlari | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Literature Review |
| 2 | Literature Review |
| 3 | Literature Review |
| 4 | Literature Review |
| 5 | Literature Review |
| 6 | Literature Review/Experimental Studies/ Scientific Excursions |
| 7 | Literature Review/Experimental Studies/ Scientific Excursions |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Literature Review/Experimental Studies/ Scientific Excursions |
| 11 | Literature Review/Experimental Studies/ Scientific Excursions |
| 12 | Literature Review/Experimental Studies/ Scientific Excursions |
| 13 | Report Preparation |
| 14 | Report Preparation |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Chemical Concentration Analysis

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| **COURSE CODE** | 151718535 | **COURSE NAME** | Chemical Concentration Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 2 | 40 | |
| **FINAL EXAM** | | | | Committee | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Definition of chemical treatment and its importance treatment in mineral processing. Solvents used in chemical treatment. Definition of solution and concentration units. Mechanism of chemical treatment and reaction kinetics. Types of ores applied for chemical treatment and examples of plants applied to this ores. | | | | | |
| **COURSE OBJECTIVE** | | | | The main aim of the course is to do research on a predetermined subject related chemical treatment applications in mineral processing, and to present and defense a prepared report to a jury. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Able to define the problems regarding to chemical treatment in mineral processing and to solve and to evaluate the data obtained from a chemical treatment process. | | | | | |
| **COURSE OUTCOMES** | | | | 1. To learn how to do literature survey.  2. To learn theoretical background of chemical treatment.  3. To learn how to select an ore suitable for separation by chemical treatment.  4. To learn how to design an experimental layout.  5. To prepare a final report.  6. Present the prepared finishing project by using MS Powerpoint. | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | 1. ÖNAL, G. ve ATEŞOK, G., 1994, Cevher Hazirlama El Kitabi. 2. ARSLAN, F., 1996, 1. Kimyasal Zenginleştirme Esaslari ve Teknolojisi, (Ders Notlari), ITÜ. 3. ACARKAN, N., 1996, 3. Değerli Metallerin Zenginleştirilmesi, (Ders Notlari), ITÜ. 4. ÖNAL,G., 1980., 4. Cevher Hazirlamada Flotasyon Dişindaki Zenginleştirme Yöntemleri. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Definition of chemical treatment in mineral processing. |
| 2 | Importance of chemical treatment and its types |
| 3 | Importance of chemical treatment in mineral processing |
| 4 | The solvents used in chemical treatment methods |
| 5 | Reaction kinetics of chemical treatment and mechanisms |
| 6 | Reaction kinetics of chemical treatment and mechanisms |
| 7 | The solvents used in chemical treatment methods |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | The parameters affecting chemical treatment |
| 11 | Application areas of chemical concentration methods in mineral processing |
| 12 | The types of ores applying chemical treatment and the process examples for chemically treated ores |
| 13 | Examples from industrial applications. |
| 14 | New advances |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [X] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [X] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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# Mining Machines Analysis

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| **COURSE CODE** | 151718536 | **COURSE NAME** | Mining Machines Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Rock mass properties; machines used for rock excavation in open pit mines or underground mines; parameters which affect rock cutting performance; index properties used for predicting of cuttability; rippability of rocks; standard laboratory test carried out on the rock samples; technical translation of scientific articles; submission and presentation of the projects. | | | | | |
| **COURSE OBJECTIVE** | | | | The main purpose of the course is to gain the capability of preparing a scientific document or project by carrying out literature search on the topic chosen from the subjects dealt with mining operations. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Follow the required steps for rock slope stability analyses and use recently developed softwares for rock slope stability problems; Acquire detailed information about excavation machines used in open pit mines and underground mines. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Carry out tests on rock samples in order to determine rock properties.  2. Aware key role of rock mass properties in rock slope stability analyses.  3. Comprehend the importance of rock mass properties on excavation mechanics.  4. Understand the index properties to be able to determine the cutting performance of excavation machines.  5. Perform literature search on the related subject either in digital databases or libraries.  6. Learn the rules which should be paid attention while preparing scientific document or project.  7. Compose the finishing project on the computer by considering the preparation format.  8. Search for the finishing project, master of science/philosophy of doctoral thesis done before.  9. Translate the scientific articles written in foreign language into Turkish.  10. Present the prepared finishing project by using MS Powerpoint. | | | | | |
| **TEXTBOOK** | | | | Books, scientific journal/periodical/magazine, thesis, databases subscribed by ESOGÜ University, etc. | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Determining a research subject |
| 2 | Literature search about the subject |
| 3 | Literature search about the subject |
| 4 | Techniques required for preparing scientific report |
| 5 | Presenting the studied subject |
| 6 | Field/Laboratory studies or theoretical works |
| 7 | Field/Laboratory studies or theoretical works |
| 8 | Midterm |
| 9 | Interpreting the obtained results |
| 10 | Interpreting the obtained results |
| 11 | Researching extensively the results obtained from study, and comparing with the results given in the literature |
| 12 | Researching extensively the results obtained from study, and comparing with the results given in the literature |
| 13 | Preparing a scientific research report about the studied subject |
| 14 | Presenting the report |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [X] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [X] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Magnetic Separation Researches.

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| **COURSE CODE** | 151718537 | **COURSE NAME** | Magnetic Separation Researches |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 50 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Introduction to magnetic separation, The importance of magnetic separation in ore processing. Basic units of magnetism, Magnetic separation of minerals, magnetic force on mineral particle, Parameters affected magnetic force, Minimum particle size that retained by a magnet, Classification of magnetic separators, Examples of magnetic separators. | | | | | |
| **COURSE OBJECTIVE** | | | | The aim of this course is to teach magnetic separation method in detail that is used in mineral processing and, all necessary information about magnetic separators and, to enable to design separation flow-sheet of magnetic separation for certain ores. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | The course enables the student to comprehend the importance of magnetic separation, and to use magnetic separation method, and to make decision over how to select an appropriate magnetic separator for a given ore. In addition to be able to recommend processing flow-sheets | | | | | |
| **COURSE OUTCOMES** | | | | 1. Learn the position and importance of magnetic separation in ore processing. 2. To decide which magnetic separator in which cases. 3. To draw more appropriate flow-sheet for a given ore. 4. To be able to interpret the outcome of the magnetic separation applications. 5. To be able to develop present ore processing by magnetic separation low-sheets | | | | | |
| **TEXTBOOK** | | | | Cevher Hazirlama ve Zenginleştirme, YILDIZ, N.,2010, Ertem Basim ve Yayin Dağitim San. Ve Tic. Ltd Şti, Ankara | | | | | |
| **SUPPORTING REFERENCES** | | | | Magnetic Methods for the Treatment of Minerals SVOBODA, J., Elsevier, 1985 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Introduction to magnetic separation, the aim of the course, giving the general information for contents of course. |
| 2 | Basic units and quantities related to magnetism. |
| 3 | Magnetic field, magnetic flux, intensity of magnetic flux, and magnetic susceptibility. |
| 4 | Classification of minerals according to their magnetic susceptibilities. |
| 5 | Parameters that affected separation, and magnetic force on the mineral particle. |
| 6 | Minimum particle size to be attracted by a magnet, and determination of critical rotation speed in roll type dry magnetic separator. |
| 7 | Classification of magnetic separators, and criteria based on the classification. |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Magnets for Protective purposes |
| 11 | Magnetic separators for enrichment purposes, low intensity dry magnetic separators, high intensity dry magnetic separators, dry magnetic separators with super conducting coils. |
| 12 | Low field intensity wet magnetic separators, high field intensity wet magnetic separator, wet magnetic separators with super conducting coils. |
| 13 | Magnetic separators for cleaning purposes |
| 14 | Magnetic separators for cleaning purposes |
| 15,16 |  |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [x] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [x] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Flotation Design

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| **COURSE CODE** | 151718538 | **COURSE NAME** | Flotation Design |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 20 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | | 1 | 20 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Literature survey and experimental studies are performed on flotation methods, applications and technologies. Studies are presented in the form of written, oral and poster presentation. | | | | | |
| **COURSE OBJECTIVE** | | | | In order to gain depth information about flotation methods, applications and technologies, literature survey in the web and experimental study in the lab are performed. Results are evaluated and presented as a written thesis, oral and poster presentation. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Flotation Design course is a selective course for Mining Engineering students for specializing in Mineral Processing. In this course, the importance of flotation , which is the most widely used mineral processing method, is understood. Literature survey, experimental study, results evaluation and presentation in oral and written format are learnt. | | | | | |
| **COURSE OUTCOMES** | | | | 1. The importance of the worked area are grasped.  2. Literature survey is performed in the web and library.  3. Previous knowledge is used in the studied work.  4. Experiments are designed, and performed, and data are collected.  5. Results are combined, evaluated, discussed and presented in written form.  6. Study are presented orally and defended.  7. A poster is prepared from the study and defended in the science fair. | | | | | |
| **TEXTBOOK** | | | | Kaya M. (2000), Flotasyon El Kitabi I | | | | | |
| **SUPPORTING REFERENCES** | | | | S. Atak (1984), Flotasyon Ilkeleri ve Uygulamasi, ITÜ, Istanbul.  B.A. Wills, (1988), Mineral Processing Technology, Pergamon Press.  Internet and library. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer, Data Show | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Research subject selection |
| 2 | Literature survey from the library |
| 3 | Literature survey from the web/internet |
| 4 | Translation and arrangment of found literature |
| 5 | Experimental set-up arrangment |
| 6 | Performing systematical experiment |
| 7 | Performing systematical experiment |
| 8 | Continuing experiments |
| 9 | Variables optimization |
| 10 | Results evaluations |
| 11 | Results discussion |
| 12 | Midterm Exam |
| 13 | Statistical analysis |
| 14 | Thesis preparation |
| 15,16 | Final Exam (Oral and poster) |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [X] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [X] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

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**Date:**

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# Support Analysis in Mines

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| **COURSE CODE** | 151718539 | **COURSE NAME** | Support Analysis in Mines |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | | 1 | 50 | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Researching about a given subject related to mining and preparing a writing report | | | | | |
| **COURSE OBJECTIVE** | | | | To research about a specific subject related to mining operations, marble production, ore production, underground mining etc., Then, to prepare a report about the results of research, finally to give a presentation and to defense this prepared report for selected jury. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Learning literature research, To evaluate and analysis the obtained technical information related to mining | | | | | |
| **COURSE OUTCOMES** | | | | To learn literature research  To write a report, to give a presentation and to defense  To decide a support system in mines | | | | | |
| **TEXTBOOK** | | | | Research literature | | | | | |
| **SUPPORTING REFERENCES** | | | | Research literature | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Computer | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | To discuss and decide about a subject related to mining activities |
| 2 | Researching about decided subject |
| 3 | Researching about decided subject |
| 4 | Researching about decided subject |
| 5 | Researching about decided subject |
| 6 | Evaluation the obtained information from literature research |
| 7 | Evaluation the obtained information from literature research |
| 8 | Midterm exam |
| 9 | Midterm exam |
| 10 | Evaluation the obtained information from literature research |
| 11 | To write a report (oral) |
| 12 | To write a report |
| 13 | To write a report |
| 14 | To write a report |
| 15,16 | Giving a presentation and defending this study. |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [X] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [X] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Surface Mining Researches.

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| **COURSE CODE** | 151718540 | **COURSE NAME** | Surface Mining Researches |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | | 1 | 25 | |
| Project | | | 1 | 25 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Conducting engineering studies within the scope of selection, design, planning, efficiency increase, determination of environmental effects, etc. of open pit production method. | | | | | |
| **COURSE OBJECTIVE** | | | | Selection of surface mining production method, engineering design. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To have the knowledge and the opportunity to practice about the surface mining production method. | | | | | |
| **COURSE OUTCOMES** | | | | Recognizes Mining Engineering,  Knows the duties and responsibilities of engineering,  Have basic knowledge about important units, terms and techniques related to Mining Engineering. | | | | | |
| **TEXTBOOK** | | | | Eskikaya, Ş., Karpuz, C. ve Hindistan, M. A.,Maden Mühendisliği Açık Ocak İşletmeciliği El Kitabı, Maden Mühendisleri Odası, Ankara, 2005. | | | | | |
| **SUPPORTING REFERENCES** | | | | Publications presented and published in scientific environments. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Determination of the subject in accordance with surface mining method |
| 2 | Literature study according to the determined topic |
| 3 | Determining the working stages according to the determined subject |
| 4 | Sampling/collection of data from the Mineral Deposit |
| 5 | Experimental studies/evaluation of data |
| 6 | Experimental studies/evaluation of data |
| 7 | Experimental studies/evaluation of data |
| 8 | Experimental studies/evaluation of data |
| 9 | Experimental studies/evaluation of data |
| 10 | Experimental studies/evaluation of data |
| 11 | Experimental studies/evaluation of data |
| 12 | Interpretation of the results and application to the surface mining method |
| 13 | Interpretation of the results and application to the surface mining method |
| 14 | Reporting of results |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [x] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [X] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Flocculation Analysis

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| **COURSE CODE** | 151718543 | **COURSE NAME** | Flocculation Analysis |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 2 | 40 | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | The importance of flocculation and dewatering in mineral processing. Definition of flocculation process and flocculant types. Flocculation mechanisms. Organic and inorganic reagents used. Adsorption of flocculant on particle surface. Factors affecting flocculation process, its application areas. New developments | | | | | |
| **COURSE OBJECTIVE** | | | | The main purpose of the course is to teach the experimental studies related to dewatering topics of mineral processing plant’s wastewaters. Gain the ability of doing researches which is scientific contents or preparing projects related to the topic. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Able to define the problems regarding to the dewatering of mineral processing plant’s wastewaters. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Comprehend the importance of flocculation, 2. Learn the definition and mechanisms of flocculation, 3. Learn the reagents used and properties of them, 4. Understand the parameters affecting flocculation, 5. Apply the flocculation methods to wastewater of mineral processing. 6. Perform literature search on the related subject either in digital databases or libraries. 7. Learn the rules which should be paid attention while preparing scientific document or project. 8. Use office programs, such as MS Word and Excel, to prepare finishing project. 9. Compose the finishing project on the computer by considering the preparation format. 10. Search for the finishing project, master of science/philosophy of doctoral thesis done before. 11. Translate the scientific articles written in foreign language into Turkish. 12. Present the prepared finishing project by using MS Powerpoint. | | | | | |
| **TEXTBOOK** | | | | Ipekoğlu, Ü., Susuzlandirma yöntemleri. Dokuz Eylül Üniversitesi, Mühendislik fakültesi yayini, No: 179, Izmir, 1997. | | | | | |
| **SUPPORTING REFERENCES** | | | | Books, scientific journal/periodical/magazine, thesis, databases subscribed by ESOGÜ University, etc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Dewatering and wastewater in mineral processing |
| 2 | Dewatering methods |
| 3 | Importance of flocculation |
| 4 | Definition of flocculation process and flocculants types |
| 5 | Flocculation mechanisms |
| 6 | Adsorption of flocculant on particle surface |
| 7 | The parameters affecting flocculation |
| 8 | Midterm exam |
| 9 | Midtrem exam |
| 10 | Organic and inorganic reagents used |
| 11 | Application areas of flocculation process |
| 12 | Examples from industrial applications. |
| 13 | Examples from industrial applications. |
| 14 | New advances |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [X] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Heavy (or Dense) Medium Separation (HMS) Recourses

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| **COURSE CODE** | 151718545 | **COURSE NAME** | Heavy (or Dense) Medium Separation (HMS) Rec. |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 25 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | | 1 | 25 | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | | Board | | | 1 | 50 | |
| **PREREQUIEITE(S) IF ANY** | | | | Seventy-five percent of the total credit amount to be achieved must be completed | | | | | |
| **SHORT COURSE CONTENT** | | | | The basic principles of preparation and presentation of the project report. The importance of gravity methods of separation and heavy medium separation in ore preparation. Principles and theories of heavy medium separation. The equipments and theirs operating parameters, problems and solutions, suggestions for solutions in heavy medium separation. The industrial circuit examples and analysis, material balance calculations (flow of liquid-solid), project preparation and presentation. | | | | | |
| **COURSE OBJECTIVE** | | | | Have more detailed theoretical and practical knowledge about the gravity methods of separation and the heavy medium separation, able to research in this area, prepare a report on the results of research and submission of the report prepared in front of the board | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | * Reinforce the basic principles of heavy media beneficiation process, * Develop the knowledge and skill to choose the devices to be used in the process, * Able to make a literature survey, * Can produce solutions to problems related to enrichment, * Design the experimental work and can apply to practice,   Prepare a report on the results of this study and submit. | | | | | |
| **TEXTBOOK** | | | | * Barry A. Wills, 2006, “Mineral Processing Technology”, Seventh Edition, Elsevier Science & Technology Boks.   Özdağ, H., 1992, Cevher Hazirlama-I, Anadolu Üniversitesi Müh. Mim. Fak. Yayinlari, No. 107, Eskişehir. | | | | | |
| **SUPPORTING REFERENCES** | | | | A.Gupta and D.S.Yan, 2006, Mineral Processing Design and Operation : Elsevier, Amsterdam. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | Calculator, Computer | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | What is the project and how prepared? |
| 2 | The basic principles of preparation and presentation of the project report. |
| 3 | The importance of gravity methods of separation and heavy medium separation in ore preparation. |
| 4 | Devices used and the operating principles, circuit designs and material balance. |
| 5 | **The first midterm exam week** |
| 6 | The problems encountered in heavy medium separation, its solutions and suggestions. |
| 7 | General frameworks of the research project and planning. |
| 8 | Starting the experimental or literature studies (Project work) |
| 9 | Continue the experimental or literature studies |
| 10 | General evaluation of outputs. |
| 11 | **The second midterm exam week** |
| 12 | Continue the project work |
| 13 | Evaluation of outputs of the project work and determination the general framework of the report. |
| 14 | The final evaluation of the project and the report for presenting. |
| 15,16 |  |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [x] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [X] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [x] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

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# Rock Slope Stability Researches

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| **COURSE CODE** | 151718546 | **COURSE NAME** | Rock Slope Stability Researches |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Softwares used for rock slope stability problems; Rock mass properties; machines used for rock excavation in open pit mines or underground mines; parameters which affect rock cutting performance; index properties used for predicting of cuttability; rippability of rocks; standard laboratory test carried out on the rock samples; technical translation of scientific articles; submission and presentation of the projects. | | | | | |
| **COURSE OBJECTIVE** | | | | The main purpose of the course is to gain the capability of preparing a scientific document or project by carrying out literature search on the topic chosen from the subjects dealt with mining operations. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Follow the required steps for rock slope stability analyses and use recently developed softwares for rock slope stability problems; Acquire detailed information about excavation machines used in open pit mines and underground mines. | | | | | |
| **COURSE OUTCOMES** | | | | 1. Analyze the rock slopes considering failure type. 2. Carry out tests on rock samples in order to determine rock properties. 3. Aware key role of rock mass properties in rock slope stability analyses. 4. Comprehend the importance of rock mass properties on excavation mechanics. 5. Understand the index properties to be able to determine the cutting performance of excavation machines. 6. Perform literature search on the related subject either in digital databases or libraries. 7. Learn the rules which should be paid attention while preparing scientific document or project. 8. Compose the finishing project on the computer by considering the preparation format. 9. Search for the finishing project, master of science/philosophy of doctoral thesis done before. 10. Translate the scientific articles written in foreign language into Turkish. 11. Present the prepared finishing project by using MS Powerpoint. | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | Books, scientific journal/periodical/magazine, thesis, databases subscribed by ESOGÜ University, etc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Determining a research subject |
| 2 | Literature search about the subject |
| 3 | Literature search about the subject |
| 4 | Techniques required for preparing scientific report |
| 5 | Presenting the studied subject |
| 6 | Field/Laboratory studies or theoretical works |
| 7 | Field/Laboratory studies or theoretical works |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Interpreting the obtained results |
| 11 | Researching extensively the results obtained from study, and comparing with the results given in the literature |
| 12 | Researching extensively the results obtained from study, and comparing with the results given in the literature |
| 13 | Preparing a scientific research report about the studied subject |
| 14 | Presenting the report |
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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [ ] | [X] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [ ] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [ ] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Metallic Mineral Beneficiation Researches

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| **COURSE CODE** | 151718547 | **COURSE NAME** | Metallic Mineral Beneficiation Researches |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | | 1 | 40 | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | |  |  | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | Descriptions of metallic ores and economic grade of these ores;  physical, chemical and physico-chemical properties of metallic ores;  mineral processing and beneficiation methods for non-ferrous metal ores; parameters affecting concentrate grade and beneficiation recovery;  Chemical analysis methods; submission and presentation of the projects. | | | | | |
| **COURSE OBJECTIVE** | | | | The main purpose of the course is to gain the capability of preparing a scientific document or project by carrying out literature survey a topic of mineral processing. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | To have detailed information about the enrichment of non-ferrous metal ores, to do research on the subject and to improve the reporting and presentation skills of the research. | | | | | |
| **COURSE OUTCOMES** | | | | 1. To determine the appropriate method for concentrating the ore, 2. To create a flow chart. 3. To do experimental work in the laboratory. 4. Learn the rules which should be paid attention while preparing scientific document or project. 5. Perform literature research on the related subject either in digital databases or libraries. 6. To prepare a report of the results and present | | | | | |
| **TEXTBOOK** | | | |  | | | | | |
| **SUPPORTING REFERENCES** | | | | Books, scientific journal/periodical/magazine, thesis, databases subscribed by ESOGÜ University, etc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Determining a research subject |
| 2 | Literature search about the subject |
| 3 | Literature search about the subject |
| 4 | Techniques required for preparing scientific report |
| 5 | Presenting the studied subject |
| 6 | Field/Laboratory studies or theoretical works |
| 7 | Field/Laboratory studies or theoretical works |
| 8 | Field/Laboratory studies or theoretical works |
| 9 | Interpreting the obtained results |
| 10 | Interpreting the obtained results |
| 11 | Researching extensively the results obtained from study, and comparing with the results given in the literature |
| 12 | Researching extensively the results obtained from study, and comparing with the results given in the literature |
| 13 | Preparing a scientific research report about the studied subject |
| 14 | Presenting the report |
| 15,16 | Final Exam |

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| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | An ability to apply knowledge of mathematics, science and engineering in mining engineering field. | [X] | [ ] | [ ] |
| 2 | An ability to identify, formulate and solve mining engineering problems. | [X] | [ ] | [ ] |
| 3 | An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. | [ ] | [ ] | [ ] |
| 4 | An ability to use the techniques, skills, and modern engineering tools necessary for mining engineering practice. | [ ] | [ ] | [ ] |
| 5 | An ability to design and conduct experiments, as well as to analyze and interpret data related to mining engineering problems. | [X] | [ ] | [ ] |
| 6 | An ability to function individually and as a team member in inter- or multi-disciplines. | [ ] | [ ] | [ ] |
| 7 | An ability to communicate in written and oral forms in Turkish/English. | [ ] | [ ] | [ ] |
| 8 | Recognition of the need for, and an ability to engage in lifelong learning. | [ ] | [ ] | [ ] |
| 9 | An understanding of professional and ethical responsibility. | [ ] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | The broad education necessary to understand the impact of mining engineering solutions in a global, economic, environmental, legal and societal context. | [X] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**

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# Occupational Health and Safety Researches

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| **COURSE CODE** | 151718548 | **COURSE NAME** | Occupational Health and Safety Researches |

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| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | **Credit** | **ECTS** | **Type** | | **Lang.** |
| 7-8 | 1 | | 4 | 0 | 3 | 6 | COMPULSORY() ELECTIVE(X) | | Turkish |
| **COURSE OF CATAGORY** | | | | | | | | | |
| **Basic**  **Science** | | **Basic**  **Engineering** | | **Engineering Subjects**  **[if it contains considerable design, mark with(√)]** | | | | **Social**  **Science** | |
|  | |  | | X | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | |
| **MID-TERM** | | | | **Evaluation Type** | | | **Quantity** | **%** | |
| Mid-Term | | |  |  | |
| Quiz | | |  |  | |
| Homework | | |  |  | |
| Project | | |  |  | |
| Report | | |  |  | |
| Others (………) | | | 1 | 40 | |
| **FINAL EXAM** | | | |  | | | 1 | 60 | |
| **PREREQUIEITE(S) IF ANY** | | | |  | | | | | |
| **SHORT COURSE CONTENT** | | | | OHS regulations in the mining workplaces,  Physical and chemical risk factors,  Occupational diseases; definition, classification, statistical information, causes, treatment and prevention,  Actions to be taken before and after emergency situations in the mining workplaces,  Risk assessment in the sector,  Accidents and proposed solutions in the workplace,  Social Security Institution statistics related to accidents | | | | | |
| **COURSE OBJECTIVE** | | | | The main objective of the course is to teach measures and applications to be taken against work accidents and the general and special rules related to occupational health and safety that could be encountered in the mining. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | Gain the ability of preparing projects about measures for occupational health and safety in the mining workplaces | | | | | |
| **COURSE OUTCOMES** | | | | 1. Ability to take precautions and prediction of work accidents in mining workplaces 2. Learning the effect on human health of the hazards within the working environment 3. Ability to interpretation the accidents statistics 4. Ability to make risk assessment 5. Identify, formulate and solve engineering problems 6. Perform literature search on the related subject in digital databases, libraries and thesis 7. Know how to develop individual project 8. Use office programs, such as MS Word, Excel and Power Point to prepare and present finishing project 9. Editing the graduation thesis on the computer, by taking attention to the rules of writing 10. Translation to Turkish of scientific articles that are written in a foreign language related to the subject | | | | | |
| **TEXTBOOK** | | | | 1. Regulation on Occupational Health and Safety in Mining Workplaces 2. Related Regulations 3. Social Security Institution (www.sgk.gov.tr) | | | | | |
| **SUPPORTING REFERENCES** | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | |  | | | | | |

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| **COURSE SYLLABUS** | |
| **WEEK** | **TOPICS** |
| 1 | Presentation of the occupational health and safety |
| 2 | Presentation of the occupational health and safety |
| 3 | To give hazard and risk factors encountered in these works |
| 4 | Explanation of occupational accidents and diseases encountered in this process |
| 5 | Explanation of occupational accidents and diseases encountered in this process |
| 6 | Starting a work on a current topic related to occupational health and safety |
| 7 | Detailing of the study on the work. |
| 8 | Midterm Exam |
| 9 | Midterm Exam |
| 10 | Detailing of the study on the work. |
| 11 | Detailing of the study on the work. |
| 12 | Studies of making the original report on the research subject. |
| 13 | Studies of making the original report on the research subject. |
| 14 | Studies of making the original report on the research subject. |
| 15,16 | Final Exam |

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| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems | [ ] | [ ] | [ ] |
| 2 | Ability to determine, define formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods | [ ] | [ ] | [ ] |
| 3 | Ability to design a system, component, and/or engineering process to under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | [ ] | [ ] | [ ] |
| 4 | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | [ ] | [ ] | [ ] |
| 5 | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | [ ] | [ ] | [ ] |
| 6 | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | [ ] | [ ] | [ ] |
| 7 | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | [ ] | [ ] | [ ] |
| 8 | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | [X] | [ ] | [ ] |
| 9 | Understanding of professional and ethical issues and taking responsibility. | [X] | [ ] | [ ] |
| 10 | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | [ ] | [ ] | [ ] |
| 11 | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions | [ ] | [ ] | [ ] |
| **1**:Low Contribution **2**:Medium contribution **3**:High contribution | | | | |

**Prepared By:**

**Signature(s)**:

**Date:**