

MINING ENGINEERING EDUCATION IN TURKEY

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- In 1872 Forestry and Mining School was established
- In 1924 Zonguldak Mining Engineering higher Scientific School was founded
- In 1950 school was revised as Zonguldak Mining Technology School
- Mining Engineering education within Universities was started in 1953 with the Mining faculty of Istanbul Technical University
- Mining Engineering department of Middle East Technical University was founded in 1960
- Recently, the number of mining engineering departments increased to 16. Five of these departments offer night classes

University	Establishment Year	Number of Graduates*
İstanbul-Tech.	1953	2661
Ankara-Middle East Tech.	1960	974
Ankara-Hacettepe	1968	798
İzmir-Dokuz Eylül	1972	1248
Zonguldak-Karaelmas	1975	1376
Eskişehir-Osman Gazi	1975	1145
Sivas-Cumhuriyet	1987	459
Isparta-Süleyman Demirel	1987	283
Malatya-İnönü	1988	158
Adana-Çukurova	1990	473
İstanbul	1991	201
Karadeniz-Tech.	1991	166
Konya-Selçuk	1992	214
Diyarbakır-Dicle	1992	153
Kütahya-Dumlupınar	1994	199
Afyon-Kocatepe	2002	-

STUDENT CAPACITIES

University	Number of Enrolled Students	
	Normal Program	Evening Program
Afyon-Kocatepe	40	-
Sivas-Cumhuriyet	50	50
Adana-Çukurova	50	50
Diyarbakır-Dicle	30	-
İzmir-Dokuz Eylül	50	-
Kütahya-Dumlupınar	50	40
Ankara-Hacettepe	50	-
Malatya-İnönü	30	-
İstanbul	30	-
İstanbul-Tech.	50	-
Karadeniz-Tech.	30	-
Zonguldak-Karaelmas	50	-
Ankara-Middle East Tech.	50	-
Eskişehir-Osman Gazi	60	60
Konya-Selçuk	50	-
Isparta-Süleyman Demirel	40	40
TOTAL	710	240

There is wide diversity between the background of the graduates depending on the quality and the number of academic staff and physical facilities of their respective department

FACULTY

University	Prof.	Assoc. Prof	Assist. Prof	Inst.	Res. Assist.	Total
Afyon-Kocatepe	-	1	2	-	4	7
Sivas-Cumhuriyet	5	2	5	-	5	17
Adana-Çukurova	1	2	6	2	7	18
Diyarbakır-Dicle	-	-	4	2	4	10
İzmir-Dokuz Eylül	10	4	8	-	14	36
Kütahya-Dumlupınar	5	1	6	-	4	16
Ankara-Hacettepe	9	1	3	2	25	40
Malatya-İnönü	1	2	6	-	3	12
İstanbul	1	2	5	-	7	15
İstanbul- Tech.	11	6	4	7	8	36
Karadeniz- Tech.	1	-	6	-	5	12
Zonguldak-Karaelmas	6	1	9	1	4	21
Ankara-Middle East Tech.	9	2	-	-	22	33
Eskişehir-Osman Gazi	7	15	6	1	8	27
Konya-Selçuk	1	1	4	-	12	18
Isparta-Süleyman Demirel	2	2	7	2	3	16
TOTAL	69	32	81	17	135	

- The criteria for promotion and appointment for academic positions are designed by Law.
- In addition to legal and administrative requirements, each university defines its own requirements.
- The number of articles pressed in SCI Journals plays very important role in promotion of academic staff

PUBLICATIONS (Articles) in SCI Journals

University	Year					
	2000	2001	2002	2003	2004	
Afyon-Kocatepe	-	-	4	2	2	0,67
Sivas-Cumhuriyet	-	2	14	11	16	1,33
Adana-Çukurova	-	-	1	7	12	1,09
Diyarbakır-Dicle	-	-	1	2	1	0,17
İzmir-Dokuz Eylül	-	-	3	5	8	0,35
Kütahya-Dumlupınar	2	1	1	4	3	0,25
Ankara-Hacettepe	5	6	6	8	9	0,60
Malatya-İnönü	1	-	1	1	8	0,56
İstanbul	2	2	5	-	5	0,56
İstanbul-Tech.	5	8	14	15	16	0,76
Karadeniz-Tech.	-	1	4	3	6	0,86
Zonguldak-Karaelmas	-	-	-	3	5	0,29
Ankara-Middle East Tech.	4	6	9	16	21	1,91
Eskişehir-Osman Gazi	2	-	3	3	5	0,26
Konya-Selçuk	1	2	3	6	5	0,83
Isparta-Süleyman Demirel	0	1	4	7	9	0,69
TOTAL	22	29	71	93	131	

- In Turkey, students for the Universities are selected through the examination held by the Inter-University Student Selection and Placement Center.
- The curriculum of mining engineering departments is adjusted to four-year basis (eight semesters)
- First two years covers basic science, engineering science and earth sciences related courses whereas the last two years includes compulsory and elective mining technology courses. There are also some non-technical courses in the curriculum.
- Duration of training (summer practices) 8-12 weeks.

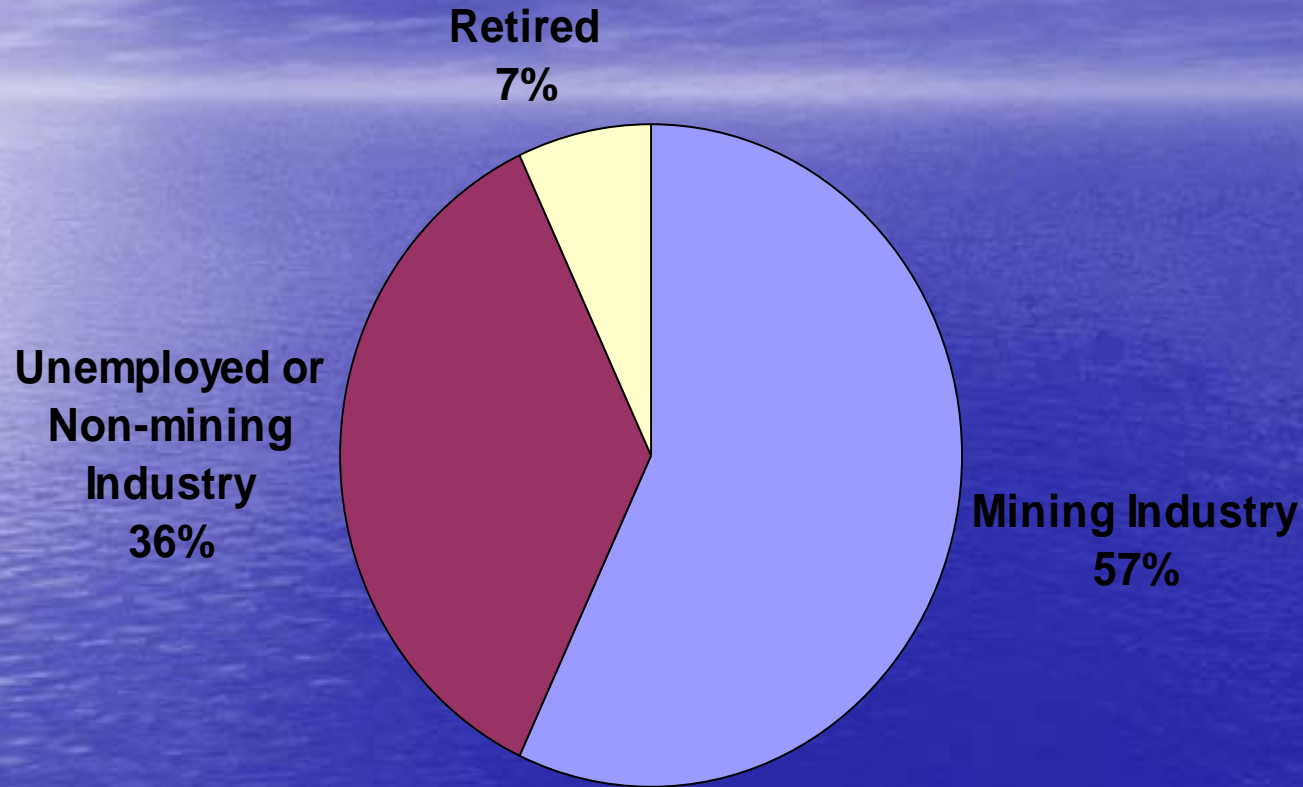
EMPLOYMENT OPPORTUNITIES

- Open pit mining
- Underground mining
- Quarries
- Tunneling
- Road and dam construction
- Construction of Underground structures
- Exploration drilling
- Dimensioned stone manufacturing
- Mineral processing plant
- Cement plants
- Integrated steel mills
- Industrial mineral processing
- Academic career
- Research and Development Institutes
- Financial and marketing companies
- Consulting companies
- Preparation of Environmental Impact Assessment
- Technical Supervision in Mines

GRADUATES

Year	Number of Graduates
Before 1999 (total)	8313
1999	673
2000	664
2001	674
2002	634
2003	669
2004	671
TOTAL	12298

Employment of Mining Engineers



MIDDLE EAST TECHNICAL UNIVERSITY

- The Mining Engineering Department established in 1960 and first started to award the degree of B.Sc. in Mining Engineering in 1964.
- Approximately 45 Freshman students are selected each year, through the entrance examination by the INTERUNIVERSITY STUDENT SELECTION AND PLACEMENT CENTER.
- Students admitted to Mining Engineering Program in 2004 came from the top 28000 out of 1.8 million applicants.

The Mining Engineering Program was reviewed by ABET (Accreditation Board for Engineering and Technology) in 1994 and 2004 and fulfilled the basic requirements.

ABET CURRICULUM

- Basic Sciences
 - Math
 - Physics
 - Chemistry
 - Probability Statistics
- Geological Science
- Engineering Science
 - Statics
 - Dynamics
 - Strength of materials
 - Thermodynamics
 - Electrical Circuits
- Engineering Topics related with Mining
 - Mining methods
 - Planning and Design
 - Ground Control and Rock Mechanics
 - Fragmentation
 - Materials handlings
 - Mineral and Coal Processing
 - Mine Surveying and Valuation

MISSION

Mission of Middle East Technical University Mining Engineering Department is to provide education, research and consulting pertinent to the science and technology of mining engineering to the highest international standards. The broad-based educational program of the department endeavors to prepare students for a variety of career paths in the vitally important subjects that provides safe, economical, efficient, environmentally and socially acceptable mining and processing of mineral raw materials; and to establish a foundation needed to solve fresh problems of our society that are susceptible of engineering treatment.

- **Program Objective #1**

Provide students with a broad foundation in mathematics, basic sciences, and engineering sciences needed to understand and quantify effectively the state-of-the-art mining engineering applications.

- **Program Objective #2**

Provide students with a creative and global view of the technical knowledge pertinent to the wide spectrum of the mining engineering profession, with emphasis placed on general principles, problem-solving fundamentals and design techniques so as to develop within students the ability to adapt themselves to changing technologies and to achieve lifelong learning and professional growth.

- **Program Objective #3**

Provide students opportunities through elective courses to gain in-depth knowledge in a technical field of their own interest, as well as some depth and breadth in the area of humanities and social sciences for broad self-development.

- **Program Objective #4** Develop the ability of students to carry out experiments, collect and interpret data, and critically report results through “hands-on” laboratory experiences.
- **Program Objective #5** Encourage students to acquire computer skills in the areas of problem analysis, design, and information technology.

- **Program Objective #6** Provide students opportunities to develop effective written and oral communication skills, and to work effectively both individually and in a team.
- **Program Objective #7** Stimulate student awareness and appreciation for professional and ethical responsibilities, health and safety features, societal concerns with regard to environmental protection, sustainable development, and contemporaneous broader issues facing the mineral industry.

Assessment

A number of assessment tools have been implemented in order to determine the effectiveness of the strategies used to achieve the Program Objectives.

- **Course and Instruction System Evaluations by Students** (Evaluations are conducted for each course at the end of the semester in which the course is taught.)
- **Evaluation of Student Laboratory Work**
- **Evaluation of Student Project Presentations**

- **Exit Survey**

Exit survey questionnaires are offered to all graduating seniors with the aim of obtaining their comments and conclusions on their assessment of all program objectives.

- **Alumni Survey**

Alumni survey is administered by the department and is conducted among the professionals who obtained their degrees in mining engineering at the Middle East Technical University.

- **Faculty Survey**

Faculty surveys are offered to all members of the faculty with the aim of obtaining their assessment about alumni, educational environment, curriculum and Program Outcomes.

- **Employer Survey**

A questionnaire is sent to the upper levels of management in companies of importance to Mining discipline with the objective of getting some opinion about the strengths and weaknesses of the graduates, and hence Mining Engineering program with respect to all the Program Objectives. It is intended to repeat this survey every five years.

Curriculum

First semester

- Math 157 Basic Calculus I
- Phys 105 General Physics I
- Chem 111 General Chemistry I
- ME 101 Engineering Graphics
- Eng 101 Developm. of Read. & Writing Skills I

Second Semester

- Math 158 Basic Calculus II
- Phys 106 General Physics II
- Chem 112 General Chemistry II
- MinE 102 Int. to Mineral Industries
- Eng 102 Develop. of Read. & Writing Skills
II

Third semester

- Math 253 Int. to Ordinary Diff. Equ.
- ES 221 Engineering Mechanics I
- GeoE 207 Prin.of Mineral., Petrogr.
- GeoE 231 Elements of Geology
- MinE 201 Underground Mining
- Non-technical Elective

Forth Semester

- ES 222 Engineering Mechanics II
- ES 224 Strength of Materials
- CENG 230 Intr. to C Programming
- GeoE 215 Principles of Structur.Geo.
- MinE 202 Surface Mining
- Eng 211. Adv. Reading and Comm.

Fifth Semester

- ES 303 Stat. Methods for Engineers
- ME 351 Thermodyn. of Heat Power
- MinE 309 Mineral Processing I
- MinE 317 Intr. to Rock Mechanics
- Non-technical Elective
- Free Elective

Sixth Semester

- CE 374 Intr. to Fluid Mechanics
- MinE 302 Mine Power - Machinery
- MinE 310 Mineral Processing II
- MinE 312 Mine Surveying
- MinE 324 Rock Fragmentation
- MinE 332 Mine System Analysis
- Non-technical Elective

Seventh Semester

- MinE 407 Mine Valuation
- MinE 417 Mine Ventilation
- MinE 419 Mat.Handling-Mine Trans.
- MinE 427 Mineral Process. Design
- Technical Elective*
- Technical Elective*

Eighth Semester

- MinE 416 Mine Design
- MinE 420 Mine Env. and Safety
- MinE 311 Adv.Communication Skills
- MinE 430 Ethics in Engineering
- Technical Elective*
- Technical Elective*

DEPARTMENTAL ELECTIVE COURSES

- MinE 413 Tailings and Effluent Management
- MinE 415 Beneficiation of Industrial Minerals
- MinE 438 Introduction to Coal Technology
- MinE 432 Mine Management
- MinE 421 Applied Rock Mechanics: Surface Structures
- MinE 446 Applied Rock Mechanics: Underground Structures
- MinE 447 Occupational Health and Safety

CONCLUSIONS

- In determining the number of mining engineering and their student quotas, the requirements of Turkey's mining sector should be considered at first priority. Also, evening programs should be closed and new departments should be avoided.
- The safety engineers in mining areas, should be employed from mining engineers.
- The summer practice problem in mining engineering education, which is becoming to be an increasingly serious concern every year, should be solved by a council formed by the Chamber of Mining Engineers and representatives from the sector.
- The requirements of the sector should be considered in M.Sc and Ph.D education in Mining Engineering.

THANKS FOR YOUR ATTENTION