ABET PROGRAM MISSION, EDUCATIONAL OBJECTIVES AND OUTCOMES

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Mining Engineering Program Mission

“The Mining Engineering Programs at Missouri S&T will continue to provide superb education and training to undergraduate and graduate students in mining engineering for the mining and construction industries of Missouri, U.S. and those global mining companies with strategic interests in the U.S. To this end, Missouri S&T will maintain outstanding faculty, experimental mine facilities, intensive explosives engineering programs, waterjet research facilities, program emphases (explosives, health and safety, coal, sustainable development, mining and the environment and quarrying), teaching laboratories, strong industry and alumni networks, and a very supportive administration. The programs will provide students with total quality education and research capabilities. From its humble beginnings in 1870, Missouri S&T has continued its tradition of excellence in educating mining engineers, who make a difference in industry and society, with scientific, technological and practical knowledge, leadership skills and professional ethics.” [Source: Missouri S&T 2007-2008 Undergraduate Catalog, page 201].

ABET Program Educational Objectives

ABET Definition: Program Educational Objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

1. Graduates will become frontline supervisors\(^1\) and middle-level managers\(^2\) within three to five years in industry.
2. Graduates will have a vital interest and a passion to remain and promote industry growth.
3. Graduates will be capable of solving industrial problems toward growth and competitiveness of their respective companies.
4. Graduates will become functional and effective leaders or members of industrial teams for carrying out the mission of their respective companies.
5. Graduates will communicate effectively the technical, social and economic aspects of the job requirements to subordinates, peers and superiors.
6. Graduates will carry out their functional responsibilities with supreme understanding of safety and health, environment and ethics.
7. Graduates will cultivate and maintain an interest in life-long learning through professional development and memberships in professional societies.
8. Graduates will continue to grow in the knowledge of relevant technologies, skills and tools for modern mining engineering practice.

ABET Program Outcomes

ABET Definition: Program Outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program. By the time of graduation, mining engineering students will

1. Become proficient in the basic sciences, including mathematics, statistics, physics and chemistry and their applications in solving mining engineering problems (ABET Outcome a)
2. Understand fundamental engineering principles in statics and dynamics, mechanics of rock structures, electrical circuits, thermodynamics, fluid mechanics and engineering design and their applications in solving mining engineering problems (ABET Outcome a)

\(^1\) Frontline supervision means a mining engineer has responsibility over a component or section of a mine.
\(^2\) Middle-level management means a mining engineer has responsibility over a whole project or a whole mine.
3. Become knowledgeable in the humanities, social sciences and management principles for understanding the non-technical aspects of the mining engineering profession, including environmental, socio-economic, and the health and safety impacts exemplified by the knowledge of the regulatory regime (ABET Outcome h.)

4. Become proficient in core mining engineering subjects (explosives engineering, materials handling, mine atmospheric control, mine economics, mine health and safety, mine management, mine planning and design, mine power and drainage, mine rescue, mine surveying, mining and the environment, rock mechanics, and surface and underground mining methods) required to carry out the professional duties of an entry level mining engineer upon graduation (ABET Outcome a)

5. Understand the geological and mineral processing dimensions for comprehensive mine design, extraction and mineral beneficiation processes (ABET Outcome a).

6. Understand geomechanics, geometric and computer-aided mine design, and optimization of flow processes for designing mine layouts to maximize health and safety, economics and production efficiency, and to minimize environmental impacts (ABET Outcome c).

7. Have the ability to outline and conduct experiments, with relevant input data and information, analysis and interpretation to draw inferences for making decisions on maintenance, improvement, or modification of an operating system ABET Outcome b).

8. Function effectively on a team by understanding team dynamics, communication, social norms and conflict management (ABET Outcome d).

9. Have the ability to identify, formulate and solve closed and open-ended problems in science, engineering, humanities, social sciences, and management from verbal and/or written statements (ABET Outcome e).

10. Understand engineering code of ethics and its impact on professional engineering practice, especially in mine design, mine health and safety, and quality control (ABET Outcome c and f).

11. Develop creative abilities for effective oral and written communication of both technical and non-technical materials for presentations to peers, superiors and subordinates with proficiency (ABET Outcome g).

12. Know contemporary engineering issues through general education requirements, involvement in professional societies, participation in student activities, and reading of professional journals (ABET Outcome j).

13. Develop leadership skills in competitive environments, project teams and organizational units through student chapter organizations, mine rescue, mine design and mucking competitions, student-initiated and student-led field trips, fund raising and community involvement (Program Core Value).

14. Have the desire and motivation toward a life-long learning process via the online Master of Engineering program, preparation toward professional engineering certification, opportunities for conference attendance and research exposure (ABET Outcome i).

15. Acquire the knowledge of the mining engineering profession through cooperative and summer internships, field trips and practical working laboratories in the Missouri S&T Experimental Mine (Program Core Value).

16. Acquire the knowledge and familiarity of the complex relationships among technology, government, society, investors, and the environment and their impact on tomorrow’s mining industry through guest lectures, in-class presentations, general education subjects and community involvement (ABET Outcome k).

17. Understand global mining issues by participating in exchange programs, internships, and in-class presentations (Program Core Value).

18. Develop a sense of responsibility and appreciation for the continuous well-being of the Mining Engineering Program and Missouri S&T (Program Core Value).