

Assessment Plan Details

OUTCOMES

Outcome a – graduates are well-prepared in application of mathematics, sciences and engineering to solve mining engineering related problems,

Goal 1

- Our graduates understand and are able to apply engineering fundamentals, mathematics and sciences to solve mining problems.

Performance Criteria

- 1) define problems
- 2) sketch physical situation
- 3) define unknowns
- 4) find missing information/data
- 5) solve problems

Practices

- problem sets
- exams
- design projects

Measures

faculty assessment of:

- problem assignments
- exams
- design projects

Feedback

- to students on all assignments
- to faculty, particularly from senior design project

Goal 2

- Our graduates who are pursuing a mining engineering career are encouraged to take the Fundamentals of Engineering(FE) examination.

Performance Criteria

- 1) Students will take FE Examination

Practices

- students are encouraged to take FE examination
- problem sets in associated subjects
- review of typical FE problems by college faculty

Measures

- statistics provided by state board

Feedback

- to faculty from statistics

Outcome b - graduates are well-prepared to conduct experiments, as well as to analyze and interpret data,

Goal 1

- Our graduates are well prepared to conduct experiments.

Performance Criteria

1. understanding the significance of individual components
2. synthesize these components to complete experimental circuit.
3. conducting experiments

Practices

- laboratory projects

Measures

faculty assessment of:

- laboratory projects

Feedback

- to students from all laboratory projects
- to faculty from performance

Goal 2

- Our graduates have analyzed and interpreted data.

Performance Criteria

1. solve sequence of simpler problems
2. analyze and interpret data

Practices

- synthesize into solution of complex problems

Measures

faculty assessment of:

- laboratory projects

Feedback

- to students from all laboratory projects
- to faculty, particularly from senior design project

Outcome c - graduates are well-prepared to design a system, component, or process to meet desired needs,

Goal 1

- Our graduates have an understanding of the individual functions of the subsystems of a particular mine system and their relationship to the overall mine system.

Performance Criteria

- 1) analysis of performance of existing sub-systems
- 2) understand interrelationship between sub-systems in complex mine plans

Practices

- problem sets
- exams
- design problem sets
- field observations

Measures

Faculty assessment of:

- problem sets
- exams
- design problem sets

Feedback

- to students on all assignments
- to faculty, particularly from mining majors

Goal 2

- Our graduates are well prepared to design individual components of a particular mine system to meet desired goal.

Performance Criteria

1. design of individual mine element
2. understanding interrelationship between sub-system in complex mine plans

Practices

- design problem sets
- field observations

Measures

faculty assessment of:

- overall presentation
- written project
- rubric evaluation of design projects

Feedback

- to students on the design project
- to faculty, particularly from senior design project

Outcome d – graduates have an ability to function on multi-disciplinary teams.

Goal

- Our graduates have experience working in teams that are either major or multi-disciplinary.

Performance Criteria

- 1) divide work appropriately/evenly
- 2) timely completion of work
- 3) respect and include views of all members
- 4) produce product content exceeding that which an individual group member could produce individually

Practices

- design projects
- mine survey
- laboratory
- year-long, senior design project

Measures

- self-assessment of design projects and laboratory experiments
- alumni self-assessment
- employer assessment

Feedback

- to students from all projects and laboratory experiments

Outcome e - graduates have an ability to identify, formulate, and solve engineering problems,

Goal 1

- Our graduates have an ability to formulate and solve the engineering problems.

Performance Criteria

- 1) analysis of performance of existing elements
- 2) identify substandard performance
- 3) design of individual mine elements

Practices

- problem sets
- exams
- design problem sets
- field observations

Measures

Faculty assessment of:

- problem sets
- exams
- design projects

Feedback

- to students from all projects
- to faculty, particularly from senior design projects

Goal 2

- Our graduates are able to apply economic and physical constraints as well as optimization methods to arrive at an effective solution.

Performance Criteria

- use economics to drive solution to problem
- define objective function
- define decision variables
- use optimization methods to find solution

Practices

- design projects

Measures

faculty assessment of:

- design projects

Feedback

- to students from all projects
- to faculty, particularly from senior design project

Goal 3

- Our graduates are able to solve complex problems by resolving them into solvable engineering sub-systems.

Performance Criteria

- 1) identify road map of a complex mine system
- 2) identify physical subsystem and economical constraints of the subsystem
- 3) use optimization or computer aided design process

Practices

- problem sets
- exams
- design problem sets
- field observations

Measures

Faculty assessment of:

- problem sets
- exams
- design projects

Feedback

- to students on all assignments
- to faculty, particularly from mining majors

Outcome f – graduates have an understanding of professional and ethical responsibility,

Goal 1

- Our students participate in professional societies meetings and the student chapter of the society for Mining, Metallurgy & Exploration Engineers for better understanding of professionalisms.

Performance Criteria

- 1) students participate in one national and two regional SME meetings per academic year

Practices

- practical observation of mining engineer during the meetings
- discussion with industrial people
- participating with students of other institution in student activities

Measures

- industrial evaluation of the student

Feedback

- to the students by department chairman

Goal 2

- Our graduates have familiarity with codes of ethics.

Performance Criteria

- 1) students will confront their own values via case studies discussed in class
- 2) students will be able to differentiate between ethical and legal issues

Practices

- class discussion, case studies, and videos in design class

Measures

- faculty evaluation of classroom discussion
- student self-assessment
- alumni self-assessment

Feedback

- to students during all classroom exercises
- to faculty from classroom exercises

Goal 3

- Our graduates demonstrate appropriate ethical behavior while students at WVU.

Performance Criteria

- 1) students will follow the rules on the majors, exams, and all other assignments
- 2) students will behave appropriately while doing group work

Practices

- conduct in groups during design projects
- conduct while doing majors
- conduct in year-long, senior design project

Measures

- faculty evaluation of student behavior
- student self-assessment

Feedback

- to faculty from all projects
- to students, if warranted

Outcome g – graduates have ability to communicate effectively,

Goal 1

- Our graduates are able to organize an oral presentation and present it in a professional manner.

Performance Criteria

1. prepare effective slides
2. effective delivery (eye contact, well-organized)
3. good physical explanations
4. tell complete story
5. good response to questions

Practices

- design projects
- laboratory presentations

Measures

faculty and peer assessment of:

- design projects
- laboratory reports
- employer assessment

Feedback

- to students from all projects and laboratory experiments
- to faculty, particularly from senior design project

Goal 2

- Our graduates are able to prepare a well written technical reports according to the prescribed format.

Performance Criteria

- 1) correct grammar
- 2) correct punctuation
- 3) correct format
- 4) correct spelling
- 5) logical organization
- 6) good physical explanations
- 7) valid documentation
- 8) tell complete story
- 9) aesthetically pleasing figures and tables

Practices

- design projects

- laboratory presentations

Measures

faculty assessment of:

- design projects
- laboratory reports
- employer assessment

Feedback

- to students from all projects and laboratory experiments
- to faculty, particularly from senior design project

Outcome h – graduates have the broad education necessary to understand the impact of engineering solutions in a global and societal context,

Goal 1

- Our graduates have an understanding of the social and global impacts of mining.

Performance Criteria

- 1) understand mining and post mining land management
- 2) environmental awareness
- 3) understanding of waste disposal methods
- 4) understanding post mining reclamation

Practices

- integration into all classes
- liberal studies program

Measures

- student self-assessment
- faculty assessment of design projects
- alumni self-assessment

Feedback

- to faculty from self-assessment instruments

Outcome i – graduates have a recognition of the need for, and an ability to engage in life-long learning,

Goal 1

- Our graduates are aware of the need for life long learning as demonstrated by their knowledge of rapidly changing mining technology they have seen on mine visits and work experiences.

Performance Criteria

- 1) learn about new technology

- 2) do more sophisticated analyses than done in class

Practices

- year-long, senior design project
- mine visits
- summer job or Co-Op

Measures

- faculty assessment and student self-assessment
- alumni self-assessment
- employer assessment

Feedback

- to faculty from all group projects and assessment instruments

Goal 2

- Our graduates are familiar with career opportunities and lifelong learning experiences such as graduate school and continuing education.

Performance Criteria

- 1) use career services
- 2) those interested demonstrate familiarity with professional/graduate school opportunities
- 3) alumni participation in continuing education

Practices

- SME student chapter meetings and field observations.
- class discussions

Measures

- student self-assessment
- alumni self-assessment

Feedback

- to faculty from all self-assessment instruments

Goal 3

- Our graduates are encouraged to attend professional meetings.

Performance Criteria

- 1) students participate in SME annual meetings
- 2) students participate in two regional SME meetings per year (i.e., PCMI/SME and WVCMI/SME)

Practices

- Students are encouraged to participate in professional meetings and financial support is provided by the college.

Measures

- 35 – 50% of student participation
- industry recognition

Feedback

- to faculty

Goal 4

- Our graduates have found information outside of class and applied it to class problems.

Performance Criteria

- learn about equipment other than those taught in class
- do more sophisticated analyses than done in class

Practices

- year-long, senior design project
- design projects
- subscription to the mining engineering magazine
- obtain mining equipment catalogues

Measures

- faculty and self-assessment of year-long senior design project
- faculty assessment of subsystem design project
- faculty assessment of laboratory experiments
- self-assessment in laboratory class
- alumni self-assessment
- employer assessment

Feedback

- to students from all projects and laboratory experiments

Outcome j - graduates have knowledge of contemporary issues,

Goal 1

- Our graduates understand the impact of government regulations and public policy on engineering practice.

Performance Criteria

- 1) understand government regulations

- 2) understand environmental laws
- 3) understand need for public awareness
- 4) understand legal vs. ethical responsibilities

Practices

- integration into all classes
- liberal studies program

Measures

- student self-assessment
- alumni self-assessment

Feedback

- to faculty from self-assessment instruments

Goal 2

- Our graduates have practical mining engineering experience.

Performance Criteria

- 1) students have summer jobs with mining industry
- 2) students may choose to participate in Co-Op program practices

Practices

- practical experience of mining operation

Measures

- industrial evaluation of the student

Feedback

- to the students by department chairman

Goal 3

- Our graduates have knowledge of contemporary mining related technologies and systems.

Performance Criteria

- 1) Sub-system design
- 2) understand interrelationship between sub-systems and complex mine plan
- 3) modification of the sub-systems or complex mine plan for implementation of contemporary issues.

Practices

- mining engineering publication and journals
- equipment manufacturing catalogs
- visit of mining equipment manufacturing companies
- problem sets
- design project
- field observation
- seminars by industrial specialists

Measures

Faculty assessment of:

- problem sets
- design projects

Feedback

- to the students on all assignments
- to faculty, particularly from mining majors

Goal 4

- Our graduates are introduced to current mining issues in different forms of public media such as current articles, documentaries and litigation.

Performance Criteria

- 1) Demonstrate knowledge of current mining issues in planning mine design
- 2) apply current issues in selecting mining methods/equipment

Practices

- problems assigned
- design projects

Measures

Faculty assessment of

- problem assignment
- design projects

Feedback

- to the students from all assignments

Goal 5

- Our graduates participate in field trips.

Performance Criteria

- 1) SME student chapter participates in 8 – 10 field trips/year
- 2) apply field information to problem assignments

Practices

- students are encouraged to participate as many as possible field trips

Measures

- 30 – 50% students participate in field trips
- industry recognition

Feedback

- to the department chair

Outcome k – graduates have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice,

Goal 1

- Our graduates are proficient in at least one operating system(such as windows), one office suite (word processor, spreadsheet, presentation) and mining application software packages (such as Vnet PC, conveyor belt, ALPS or STOP).

Performance Criteria

- 1) solve problems using software
- 2) prepare written reports
- 3) make slides for presentations

Practices

- problem sets
- design projects
- laboratory reports

Measures

faculty assessment of:

- problem assignments
- design projects
- laboratory reports

Feedback

- to students from all assignments

Goal 2

- Our graduates have the ability to use computer-based information systems such as the World Wide Web, government data bases, online equipment manufacturing data, and information systems found in the libraries.

Performance Criteria

- 1) proficient in using the world wide web to find information
- 5) access information data bases such as those in system optimization
- 6) use library data bases

Practices

- year-long, senior design project
- design projects

Measures

- faculty assessment of year-long senior design project
- student and alumni self-assessment

Feedback

- to students from all projects

Outcome I – graduates have an understanding of the importance of economics, environment, health and safety issues in the design and operations of modern mines,

Goal 1

- Our graduates are able to design cost-effective mining systems.

Performance Criteria

- 1) application of engineering economics
- 2) understand law of supply and demand
- 3) understand global nature of mining industry
- 4) understand physical and economics constraints

Practices

- design projects
- majors
- year-long, senior design project
- integration into all classes
- liberal studies program

Measures

- student self assessment
- faculty assessment of design projects
- alumni self-assessment

Feedback

- to faculty from self assessment instruments

Goal 2

- Our graduates have an understanding of the interrelationship between mining, permitting and environment.

Performance Criteria

- 1) demonstrate concept of mining environmentally friendly
- 2) mining methods with least environmental impact
- 3) understanding pre-post mining implication on the environment

Practices

- problems assigned
- design projects
- majors
- year-long, senior design project

Measures

faculty evaluation of :

- all design projects
- problems assigned

Feedback

- to students from all projects
- to faculty, particularly from year long, senior design project

Goal 3

- Our graduates have an understanding of mining health and safety issues and governing regulations.

Performance Criteria

- 1) understand geologic condition
- 2) understand material capability
- 3) understand mine design parameters
- 4) understand equipment limitations
- 5) understand physical constraints
- 6) understanding working environments

Practices

- design projects
- majors
- year-long, senior design project

Measures

- faculty evaluation of all design projects
- student self-assessment
- alumni self-assessment

Feedback

- to students from all projects
- to faculty, particularly from senior design project