NCEES
advancing licensure for engineers and surveyors

Principles and Practice of Engineering Examination
MINING AND MINERAL PROCESSING CBT Exam Specifications

Effective Beginning October 2025

- The PE Mining and Mineral Processing exam is computer-based. It is closed book with an electronic reference.
- Examinees have 9.5 hours to complete the exam, which contains 85 questions. The 9.5-hour time includes a tutorial and an optional scheduled break. Examinee works all questions.
- The exam uses both the International System of units (SI) and the U.S. Customary System (USCS).
- The exam is developed with questions that will require a variety of approaches and methodologies, including design, analysis, and application.
- The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.
- The exam includes universal considerations common to each of the knowledge and skill groups. The universal considerations topics include general engineering skills, engineering economics and cost management, observance of laws and regulations, and facility construction. These universal considerations may be incorporated into any of the questions on the exam.

		Number of Questions
1.	**Exploration: Methods and Techniques**	**3–5**
	A. Fundamental physical and structural geology, stratigraphy, mineralogy, petrology, and geochemistry	
	B. Geological surveying and mapping (e.g., aerial photography, strike and dip, three-point problems, exploration sampling techniques, exploratory drilling, trenching, and field sampling)	
	C. Laws and regulations governing hard-rock minerals, leasable minerals, and common-variety minerals (e.g., 1872 Mining Law, Title 43 CFR)	
2.	**Exploration: Site Geologic and Geotechnical Conditions**	**3–5**
	A. Hydrology/hydrogeology	
	B. Analysis and interpretation (e.g., chemical and physical properties of the samples, rock mass classifications, and ground stress)	
	C. Modeling (e.g., geologic and reserve block model)	
3.	**Exploration: Resources/Reserves**	**5–8**
	A. Resource/reserve classification	
	B. Economic geology	
	C. Resource estimation techniques and interpretation (e.g., quality and quantity methodologies)	

4. Mine Planning/Operations: Mining Methods and Layouts **7–11**

A. Surface mining methods and planning (e.g., contour strip, open pit/area, quarry, dredging, and highwall)
B. Underground mining methods and planning (e.g., block caving, cut and fill, room and pillar, shrinkage stoping, underhand and overhand stoping, longwall, and multiple-seam mining)
C. In situ mining methods and planning
D. Deposit and site access (e.g., adits, slopes, shafts, haul roads, and site roads)

5. Mine Planning/Operations: Mine Equipment, Facilities, and Systems **8–12**

A. Production
B. Material handling and transportation
C. Ventilation
D. Power generation and distribution (e.g., electrical, battery, compressed air, and hydraulic)
E. Rock fragmentation (e.g., cutting/boring machines, drilling, blasting, and explosives)
F. Pumping, dewatering, and drainage
G. Communication, monitoring, and control systems

6. Mine Planning/Operations: Ground Control **6–9**

A. Surface and underground mine ground control analysis and methods (e.g., slope stability, strata control, pillar design, shaft stability, and geomechanics)
B. Use of rock mass classification systems (e.g., RQD and RMR)
C. Physical properties and strength-testing techniques, results, and application

7. Mine Planning/Operations: Mine Planning and Site Layout **6–9**

A. Mine surveying and mapping (e.g., instruments, GPS, automated unmanned systems [AUS], and GIS)
B. Operational requirements (e.g., equipment, materials, personnel, logistical support, and planning programs)
C. Mine maintenance systems
D. Facility site layout

8. Mineral Processing: Laboratory/Pilot Testing and Results **4–6**

A. Lab-scale metallurgical, mineral processing, and analytical test procedures (e.g., assay techniques, diagnostic leaching, extraction kinetics, solvent extraction, Bond work index, coal washability, and physical separations)
B. Integration of mineralogical and chemical characteristics for selection of appropriate processing techniques

9. Mineral Processing: Process Flow Sheets **6–9**

A. Laboratory and pilot results interpretation, process flow sheet determination, and production level scale-up
B. Extractive metallurgical principles (e.g., hydrometallurgy and pyrometallurgy)

C. Comminution, classification, and beneficiation principles (e.g., crushing, grinding, flotation, gravity separation, and screening)
D. Solid/liquid separation principles (e.g., thickening, filtration, and countercurrent decantation [CCD])
E. Material, mass, water, heat, and energy balances

10. Mineral Processing: Plant Equipment, Facilities, and Systems 9–14

A. Site considerations and plant layout
B. Piping and instrumentation diagrams (P&ID)
C. Unit operations and equipment selection and sizing (e.g., tank sizing, heap sizing, pumping, piping, tailings volumes, and conveying)
D. Control of plant and facility performance (e.g., operation and maintenance of mill or mineral processing equipment, and process control systems)
E. Operational requirement evaluation (e.g., reagents, materials, personnel, mill feed, and logistical support)
F. Process sampling

11. Environment and Reclamation: Site, Mining, and Processing Characterization/Baseline 3–5

A. Contaminant identification and transport (e.g., air, ground/surface water, and solids)
B. Site conditions (e.g., water quality, geochemistry, geology, ecology, and biology)
C. Waste characterization

12. Environment and Reclamation: Environmental Management Systems 5–8

A. Waste disposal, treatment, and containment systems (e.g., backfill, tailings and slurry impoundments, caps, liners, leakage recovery and detection systems, and spent heap leach)
B. Water management and treatment systems (e.g., wastewater, potable, process, mine, and wetlands)
C. Operational monitoring, inspection, maintenance, and analysis (e.g., tailings dams, ponds, subsidence, ground and surface water, vibration, noise, air, and dust)
D. Pollution prevention measures (e.g., sediment control, surface water discharge, fugitive dust, air filtration systems, and stormwater management)

13. Environment and Reclamation: Reclamation Plan and Cost 5–8

A. Reclamation planning
B. Cost estimation
C. Postclosure