**First class mine manager – qualification self-assessment**

Include this form when you submit your application for the first class mine manager statutory certificate.

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| **Relevant qualification guidance**  **(Candidates qualification must meet one (1) of the two (2) outlined below)** | | | | |
| **Option one** | **Institution** | **Minimum award** | **Qualification field** | **Mandatory units** |
| University | 4 Years | Bachelor of Mining Engineering from an Australian University | * Nil |
| Degree |
| **Option two** | **Institution** | **Minimum award** | **Qualification field** | **Mandatory units** |
| University | 4 Years | Accredited engineering degree   * + Mining Engineering   + Metallurgical Engineering   + Geological Engineering   + Geotechnical Engineering   + Petroleum Engineering   + Geophysical Engineering * Civil Engineering * Environmental Engineering * Mechanical Engineering | * Geology for Resource Engineers * Fluid Mechanics * Engineering Mechanics * Fundamentals of Mineral Processing * Mining Geomechanics or Applied Geomechanics in Mining (Rock and Soil) * Mining Methods * Rock Breakage or Rock Excavation Technology * Mine Planning or Mine Systems Engineering * Mine Design and Feasibility * Mine Ventilation or Underground Mine Ventilation * Mine Management or Mining Project Management and Operational Readiness * Mine Geotechnical Engineering or Applied Geotechnical Engineering |
| Degree |
| **OR** | | |
| University | 3 Years | Accredited science degree   * Mining Science * Geology * Earth Science (related to the mining industry) * Mine Surveying * Environmental Science * Metallurgy Science |
| Degree |

To be completed by the candidate, you must show that your qualifications meet the requirements listed above.

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| **Candidates’ qualification details** | | | | | |
| **Candidates name** | Click or tap here to enter text. | | | | |
| **Name of award** | Click or tap here to enter text. | | | | |
| **Issuing institution** | Click or tap here to enter text. | | **Qualification field** | Click or tap here to enter text. | |
| **Mandatory units (if applicable)** | | **Equivalent completed unit name** | | | **Unit code** |
| Geology for Resource Engineers | | Click or tap here to enter text. | | | Click or tap here to enter text. |
| Fluid Mechanics | | Click or tap here to enter text. | | | Click or tap here to enter text. |
| Engineering Mechanics | | Click or tap here to enter text. | | | Click or tap here to enter text. |
| Fundamentals of Mineral Processing | | Click or tap here to enter text. | | | Click or tap here to enter text. |
| Mining Geomechanics or Applied Geomechanics in Mining (Rock and Soil) | | Click or tap here to enter text. | | | Click or tap here to enter text. |
| Mining Methods | | Click or tap here to enter text. | | | Click or tap here to enter text. |
| Rock Breakage or Rock Excavation Technolog | | Click or tap here to enter text. | | | Click or tap here to enter text. |

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| **Mandatory units (continued)** | **Equivalent completed unit name** | **Unit code** |
| Mine Planning or Mine Systems Engineering | Click or tap here to enter text. | Click or tap here to enter text. |
| Mine Design and Feasibility | Click or tap here to enter text. | Click or tap here to enter text. |
| Mine Ventilation or Underground Mine Ventilation | Click or tap here to enter text. | Click or tap here to enter text. |
| Mine Management or Mining Project Management and Operational Readiness | Click or tap here to enter text. | Click or tap here to enter text. |
| Mine Geotechnical Engineering or Applied Geotechnical Engineering | Click or tap here to enter text. | Click or tap here to enter text. |

## Additional information on mandatory units (for candidates that do no hold a Bachelor of Engineering [Mining Engineering] from an Australian University)

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| **Geology for Resource Engineers** | Introduction to planet Earth and its geological resources. Key rock types, igneous, metamorphic, and sedimentary and how their constituent minerals and structures define a range of rock properties. 3-dimensional patterns of rock units and structures from maps, cross-sections and stereographic projections; and, identify key ore and fossil fuel deposit types and learn how their size, shape and location are controlled by the spatial arrangement of rock types and structures. |
| **Fluid Mechanics** | Introduction to basic properties of fluids, flow fields, velocity profile (Couette flow) and Newton's law of viscosity, Reynolds number. Hydrostatics, control-volume analysis - mass conservation and momentum equation. Bernoulli equation, measurement of pressure, flow speed and volumetric flow rate, and applications of Bernoulli equation. One-dimensional energy equation, laminar flow in pipes and channels, laminar-to-turbulent transition, turbulent flow in pipes, index and logarithmic laws, wall-roughness, Pump types and characterisation. |
| **Engineering Mechanics** | Basics of bending moment, shear, torsion, deflection, and buckling in the context of mechanics of materials. Principal stress and strain in materials, leading to failure criterion with a special focus in the area of Geomechanics, such as Mohr-Coulomb and Hoek-Brown criteria. Problem solving in all concepts relates the theoretical background to real-world applications. OR Newton's Laws; Forces as vectors, equilibrium of concurrent and non-concurrent forces; Couples and distributed forces. Equilibrium of statistically equivalent systems; Free bodies and free-body diagrams; Simple frameworks, trusses; Internal actions within a beam; Relationship between load and response; Axial stress and strain, elasticity; Axial deformation; Shear stress and strain, shear modulus; Deformations in shear; Thermal effects and resulting stress and strain; Principles of compatibility; Concept of stiffness; Superposition; Kinematic equations; Linear motion; Projectile motion. Curvilinear and relative motion; Plane kinetics, Newton's second law in n-t coordinates; Linear momentum; Elastic and inelastic collisions. Work, forces and power; Potential and kinetic energy; Elastic energy; Energy conservation; Plane kinematics and kinetics of rigid bodies; Rotation about a fixed axis. Hydrostatic pressure; Static fluid forces on simple structures; Analysis of fluid; Momentum flux of all fluid flows. Bernoulli's equation. |
| **Fundamentals of Mineral Processing** | Main technologies and techniques currently used for mineral processing in the mining industry. Three overarching processes: the comminution and liberation of minerals; the separation of minerals; and, the extraction of metals, including emerging approaches, technologies and digital applications in these areas. Sustainability issues including energy consumption to environment considerations, and safety risks associated with mining processing operations, as well as factors impacting efficiency and cost of the processing system. |
| **Mining Geomechanics or Applied Geomechanics in Mining (Rock and Soil)** | Fundamental knowledge required to undertake more advanced geotechnical investigations and design tasks. The basics of rock and soil (deformable material) behaviour - stress strain, strength & deformation, and failure criteria, which are introduced within the following two themes: Basic soil mechanics - soil classification, phase relationships, effective stress, seepage and flow, compaction and shallow foundations and soil laboratory practical testing. Basic rock mechanics, - rock classification, rock mass, discontinuity, and material- behaviour, rock mass strength model, rock laboratory practical testing, and response of rock mass to excavation.  OR Basics of rock and soil (deformable material) behaviour, stress and strain, strength, deformation, and failure criteria; introduced within the following two main themes: Basic soil mechanics and Basic rock mechanics. |
| **Mining Methods** | A comprehensive understanding of the principles and applications of the major surface and underground mining methods, materials handling and transport systems, and support infrastructure. Mine services and infrastructure, surface mining methods (open pit mining, open cast or strip mining, solution mining, and other mining methods), underground mining methods (mine access and development, room, and pillar mining, cut and fill mining, sublevel stoping, narrow vein mining, caving methods, long-wall coal mining, bord and pillar coal mining). Equipment selection and infrastructure and technology requirements, including emerging technologies such as automation and remote operation. |
| **Rock Breakage or Rock Excavation Technology** | The principal methods of rock breakage used in mining including machine mining, drilling, and blasting. Machine mining encompasses rock cutting principles, cutting with picks and discs, the design of cutter heads, effect of wear, assessment of rock cut ability, impact breakage and ripping. Drilling encompasses the methods of drilling used in mining and the impact of drilling parameters on performance and selection and costing of drilling equipment. Blasting encompasses the chemistry of explosives and mechanics of explosive-rock interaction, selection of commercial explosives, explosive charging techniques, initiation and delay systems, blast design principles for surface and underground mines, safety, environmental and regulatory management and blast performance assessment and analysis. |
| **Mine Planning or Mine Systems Engineering** | Theoretical principles and practical methodologies associated with mine planning, entailing elements of design, scheduling and evaluation, including, short and long term planning, mine optimisation, cut-off grade analysis and mining valuation. The principles of surface and underground mine planning and valuation for metalliferous and coal mining. The application of algorithms and mining software to establish the extent and sequence of production in mining operations. The development and implementation of mathematical models for mine planning and will solve mining operations-related problems using authentic data sets. |
| **Mine Design and Feasibility** | Principles of mine feasibility studies for coal and metalliferous deposits. Assessment of reserves, method selection, mine design layout for open pit and underground mining, geo-technical design, ventilation design, mine production scheduling, equipment selection, designing for closure, cost estimation and project valuation. Use state-of-the-art mining design and planning software to complete the mine design and feasibility study. |
| **Mine Ventilation or Underground Mine Ventilation** | The attributes, knowledge, and techniques that are required to provide a safe underground working environment through sound ventilation practice. Topics covered include - ventilation and mine services, environmental containments, heat in underground mines, ventilation system management, coal mine hazards and control, coal mine ventilation, metalliferous mine hazards and control, and metalliferous mine ventilation.  OR Basic Computational Fluid Dynamics (CFD) and its application in mining engineering, and ventilation theory and underground mine ventilation design. |
| **Mine Management or Mining Project Management and Operational Readiness** | Provides an appreciation of management principles and practices vital to a mine manager's successful running of a mining enterprise: Strategic minerals management; mining law, safety and risk management; and operations management. |
| **Mine Geotechnical Engineering or Applied Geotechnical Engineering** | Provides the ability to apply soil and rock mechanics to the design of underground and surface mine excavations and associated infrastructure. The use of cutting-edge instrumentation, monitoring, real-time data analysis and analytics to inform and validate appropriate mining method selection and mine design. Core geotechnical risks associated with different mining methods, along with the mitigation measures to manage these risks. The use of modern geotechnical design procedures to provide innovative, safe and cost- effective solutions to surface and underground mining challenges, such as those relating to: slope stability; underground excavation and stope stability; the use of support and reinforcement pillars; and the design and management of waste rock dumps and tailings facilities. |