

Curriculum Code: 311701-0021

Curriculum Title: Mining Technician: Assistant Mine  
Planner

Document Status: DRAFT

Development Quality Partner

Name	Organisation	Contact
Mine Qualifications Authority	SETA	



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# Section 1: Curriculum overview

## 1 NOPF Information

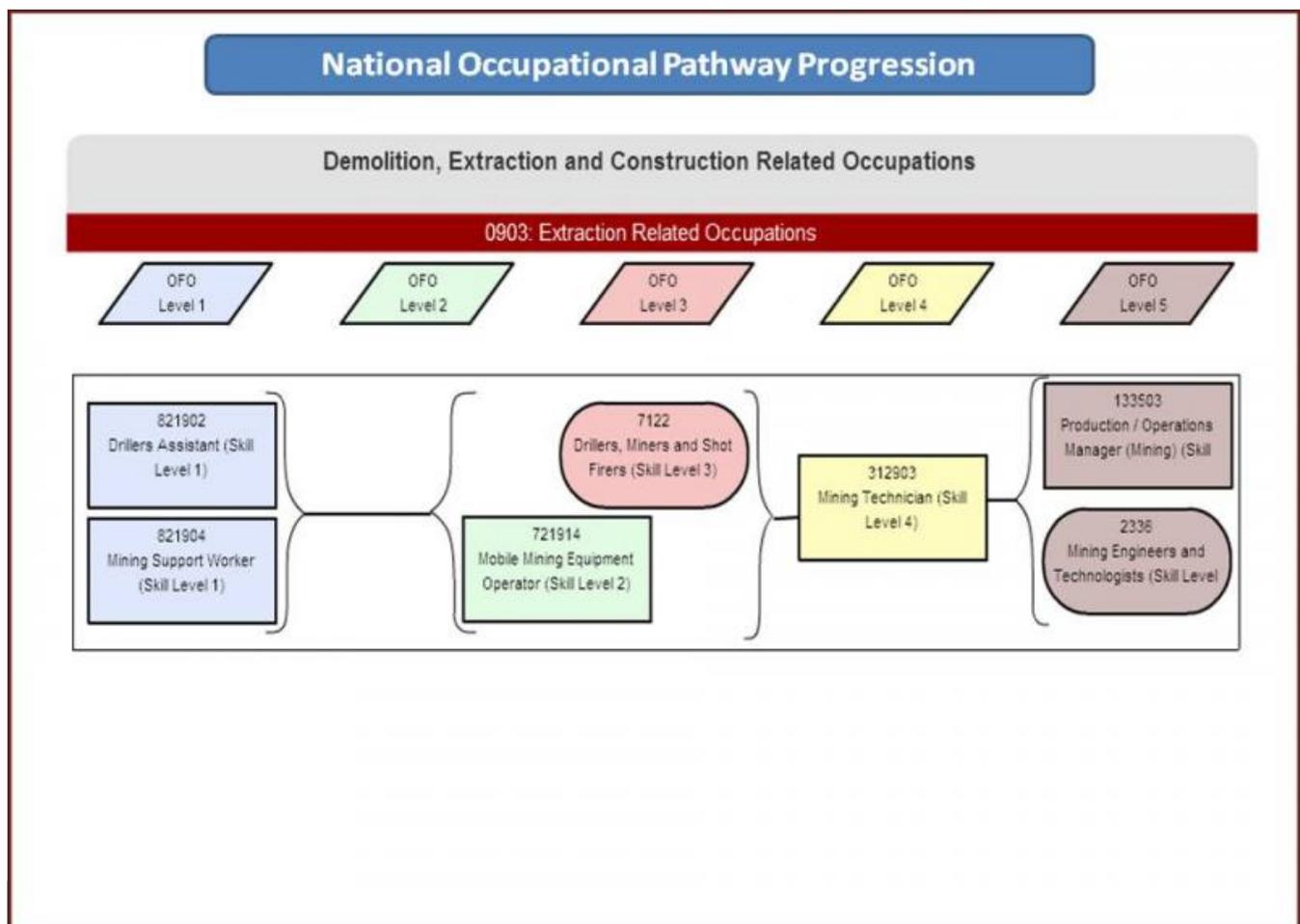
### 1.1 Occupational Cluster

### 1.2 Occupational Field

### 1.3 Occupational Family

Mining Technicians

### 1.4 Relation of this Occupation to Occupational Progression Pathway



#### Description:

1. The Occupation is an entry level occupation into the Mine Planning Discipline. People can enter from outside the industry or through promotion from within.

## **2 Occupational Information**

### 2.1 Related Occupations

- Assistant Sampler

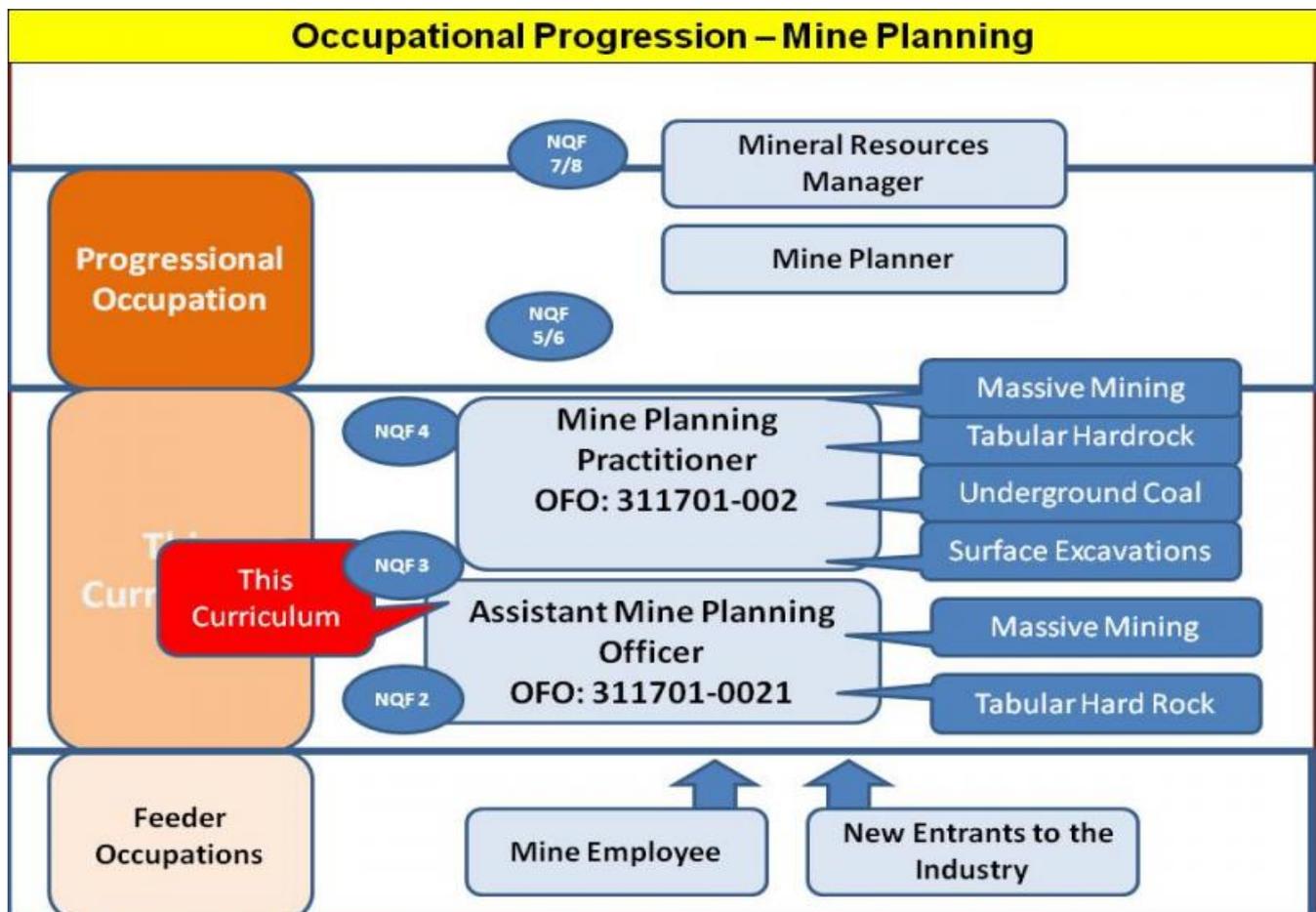
### 2.2 Occupation or Specialisation Addressed by this Curriculum

### 2.3 Alternative Titles used by Industry

1. Trainee Planner

### 3 Curriculum Information

#### 3.1 Relation of this Curriculum to the Occupation and Occupational Progression



#### Description:

1. Consideration should be given to incorporating the learning specified here into one qualification combining it with that of the Mine Planning Practitioner.

### 3.2 Curriculum Structure

#### Knowledge Subject Specifications

Number	Title	NQF Level	Credits
311701-0021-KS-02	Introduction to Mine Planning	2	40

Total Knowledge Credits: **40**

#### Practical Skills Modules

Number	Title	NQF Level	Credits
311701-0021-PM-01	Updated mining layouts to schedule the required resources to achieve the production rates	3	34

Total Practical Skill Credits: **34**

### Work Experience Modules

Number	Title	NQF Level	Credits
311701-0021-WM-01	Mine planning processes		93

Total Work Experience Credits: **93**

**TOTAL QUALIFICATION CREDITS: 167**

**Knowledge Percentage: 24%**

**Practical Skills Percentage: 20%**

**Workplace Percentage: 56%**

## 3.3 International Comparability

## 3.4 Entry Requirements

- Grade 12 Maths

## 4 Assessment Quality Partner Information

Name	Organisation	Contact
TO BE DETERMINED		

## 5 Modules of Employable Skills (MES) associated with the occupation

# Section 2: Occupational Profile

**Title: Mining Technician: Assistant Mine Planner**  
**OFO Code: 311701-0021**

## Occupational Purpose

Assistant Mine Planning Officers: Supports all the activities that is executed by the Mine Planning Practitioner. The main objective of this job is to learn the basics of the occupation, gain experience in the field and provide assistance and support in executing the duties required of a Planning Practitioner. To become fully competent as a practitioner the incumbent will have to complete the full qualification for Practitioners.

## Occupational Tasks

2.1. Assisting with the production of short and medium term Mineral Extraction layouts and production schedules including resource and equipment requirements for mining final products (NQF Level: 3)

## Occupational Task Details

2.1. Assisting with the production of short and medium term Mineral Extraction layouts and production schedules including resource and equipment requirements for mining final products (NQF Level: 3)

### Unique Product or Service

Short and medium term mineral extraction plans and schedules

### Occupational Responsibilities

1 - Updated mining layouts to schedule the required resources to achieve the production rates

### Context

1 - Mine planning processes

# **Section 3: Curriculum Component Specifications**

# Section 3A: Knowledge Subject Specifications

Number	Title	NQF Level	Credits
311701-0021-KS-02	Introduction to Mine Planning	2	40

Total Knowledge Credits: **40**

**Subject Number:** 311701-0021-KS-02

**Subject Title:** Introduction to Mine Planning

**Related Study Field (CESM )**

## **Purpose of the Subject**

The focus of the learning in this subject is on building the learners understanding of the overall functioning of a mine and what the role of mine planning is to ensure the success of the mining operations.

## **Topic :1 - Total mining value chain. (Basic) (Credits: 2)**

### **Topic Elements:**

1. Explain the broad range of mining commodities and their common uses. (NQF Level: 2)
2. Describe what is meant by a value chain (NQF Level: 3)
3. Identify and draw a basic mining value chain. (NQF Level: 3)
4. Indicate how planning impacts on the efficiency of the mining value chain. (NQF Level: 4)

### **Internal Assessment:**

1. Given basic questions regarding the challenges of mining be able to draw a basic mining value chain and explain how planning impacts on the efficiency of the value chain. (Weight: 100%)

## **Topic :2 - Basic concepts and principles associated with Mining Geology. (Credits: 4)**

### **Topic Elements:**

1. Describe the broad work process of the geological function in creating geological models for planning purposes. (NQF Level: 3)
2. Define what is meant with Geology and indicate the main geological features, structures and stratigraphy associated with typical mineral deposits. (NQF Level: 4)
3. Describe the basic principles of determining the value of the mineral resource and reserves (Grade, dilution and classification.) (NQF Level: 4)
4. Discuss the impact and detection of extraneous geological features in the mining environment (Water and gas) (NQF Level: 3)
5. Describe the typical ore bodies and their characteristics (Reefs, channel widths, massive deposits, mineralogies) (NQF Level: 4)

### **Internal Assessment:**

## **Topic :3 - Basic concepts and principles associated with Evaluation and Sampling (Credits: )**

**Topic Elements:**

1. Describe the basic principles and methods of mine sampling. (NQF Level: 3)
2. Identify and describe the purpose of mine sampling and indicate how sampling data is used on the mines. (NQF Level: 3)
3. Explain the broad mine sampling process and identify the relevant documentation used in the sampling process. (NQF Level: 2)

**Internal Assessment:****Topic :4 - Basic concepts and principles associated with Mine Survey (Credits: 3)****Topic Elements:**

1. Explain the role of the mine survey function on mines and indicate the legal implications. (NQF Level: 3)
2. Identify and describe the meaning of the typical terminology used in mine surveying. (NQF Level: 3)
3. Describe the typical mine survey measurement cycle and process. (NQF Level: 3)
4. Discuss and explain the basic metal accounting and reconciliation processes used on mines. (Ore flow, mine call factor, recovery, dilution tonnage reconciliation, mining widths) (NQF Level: 4)

**Internal Assessment:****Topic :5 - Basic concepts and principles associated with Rock Engineering (Credits: 3)****Topic Elements:**

1. Describe what is meant by Rock Engineering and Strata Control. (NQF Level: 2)
2. Basic principles of mine support and the main support types used. (NQF Level: 2)
3. Influence of Rock Engineering on mine planning at different depths. (Seismicity, rock falls, layouts, mining methods) (NQF Level: 4)

**Internal Assessment:****Topic :6 - Basic concepts and principles associated with Mine Ventilation. (Credits: 3)****Topic Elements:**

1. Describe the purpose and importance of mine ventilation. (NQF Level: 2)
2. Explain the main principles of mine ventilation (Air flow, heat transfer, humidity etc.) (NQF Level: 3)
3. Identify and explain the main hazards associated with mine ventilation. (Heat, gas, air supply) (NQF Level: 3)
4. Explain the definitions of the key terms and measurements used by the mine ventilation and occupational hygiene functions. (NQF Level: 3)

**Internal Assessment:****Topic :7 - Generic concepts and principles of planning. (Credits: 8)****Topic Elements:**

1. Explain the generic management cycle and indicate the importance of continuous planning within the management cycle. (NQF Level: 4)
2. Identify and describe the key components and activities of mine planning and the typical mine planning cycle. (NQF Level: 3)
3. Identify and describe the key terms used in mine planning. (Strike, dip, middling, advance etc.) (NQF Level: 3)
4. Explain the key principles and techniques for developing schedules. (NQF Level: 3)
5. Describe the main scheduling inputs and parameters to be used in developing a mining schedule. (NQF Level: 3)

6. Describe the broad principles of the typical mine planning software. (NQF Level: 4)
7. Describe the potential impact of the constraints of mine logistics and infrastructure on mine planning. (Transportation of people, material, equipment and minerals) (NQF Level: 4)
8. Explain the implications of the various levels of mine planning and how they relate to each other. (NQF Level: 3)
9. Describe the structure and symbols used on mine plans and identify the main features, elevations and directions indicated on a mine plan. (NQF Level: 3)

**Internal Assessment:****Topic :8 - Operating principles of beneficiation plants on mines. (Credits: 1)****Topic Elements:**

1. Identify and describe what is meant by beneficiation. (NQF Level: 2)
2. Describe the basic dynamics of the major types of beneficiation processes. (NQF Level: 2)
3. Explain how the different beneficiation methods are catered for in planning. (NQF Level: 3)

**Internal Assessment:****Topic :9 - Role of engineering and the various engineering functions on a mine. (Credits: 2)****Topic Elements:**

1. Describe the main engineering functions and installations on a typical mine. (NQF Level: 3)
2. Explain the main principles and processes of maintenance and how this impacts on mine planning. (NQF Level: 3)
3. Describe the need for stability in the supply of utilities and the planning thereof. (NQF Level: 3)

**Internal Assessment:****Topic :10 - Concepts and principles of risk assessment (Basic) (Credits: 2)****Topic Elements:**

1. Describe the concept of risk and explain the basic risk management process and terminology. (NQF Level: 3)
2. Identify the implications of risk management on mine planning. (Cause and effect, probability and impact) (NQF Level: 3)
3. Identify some of the main risks in typical mine plans. (NQF Level: 4)

**Internal Assessment:****Topic :11 - Mining methods, layouts, cycles, processes and terminology. (Intermediate) (Credits: 8)****Topic Elements:**

1. Describe the terms used in the typical mining methods in South Africa (NQF Level: 3)
2. Explain the applications and implications of the main tabular mining methods. (NQF Level: 3)
3. Explain the applications and main implications of other mining methods. (NQF Level: 3)
4. Describe the typical mining designs and layouts applicable to the main mining methods used in South Africa. (NQF Level: 4)
5. Describe the implications of the various logistical infrastructure designs on mine planning. (NQF Level: 4)
6. Identify and explain the typical mining cycle and how this impacts on short term mining planning. (NQF Level: 4)

**Internal Assessment:****Topic :12 - Regulatory framework for occupational health and safety on mines. (Credits: 4)**

**Topic Elements:**

1. Explain the origin of law and the role of the constitution in regulatory requirements. (NQF Level: 2)
2. Indicate the need for the proper management of Occupational Health and safety risks by stating some statistical data of accidents and injuries. (NQF Level: 2)
3. Explain the definition of Occupational Health and safety. (NQF Level: 2)
4. Explain the different roles found in the OHS function (Occupational Health, Occupational Safety and Occupational Hygiene) (NQF Level: 3)
5. Describe the impact of planning of creating a safe and healthy work environment. (NQF Level: 4)
6. Consequences of accidents and incidents on employees and the company. (NQF Level: 3)
7. Identify the various regulatory requirements that impact on OHS in mines. (NQF Level: 4)

**Internal Assessment:**

1. Given a range of basic scenarios relating to accidents and incidents on mines. Be able to identify how proper planning could have prevented the incidents or reduced the impact of the accidents. (Weight: 100%)

**Exemptions:**

**Provider Accreditation Requirements:**

**Physical Requirements:**

**Human Resources Requirements:**

**Legal Requirements:**

# Section 3B: Practical Skill Module Specifications

Number	Title	NQF Level	Credits
311701-0021-PM-01	Updated mining layouts to schedule the required resources to achieve the production rates	3	34

Total Practical Skill Credits: **34**

**Practical Skills Module Number:** 311701-0021-PM-01

**Practical Skills Module Title:** Updated mining layouts to schedule the required resources to achieve the production rates

## **Purpose of the Module:**

The focus of the learning in this module is to provide learners an opportunity to build their skills in executing the basic tasks required in a mine planning office.

## **PRACTICAL SKILL: Access and operate desktop computer hardware. (Credits: 2)**

### **Applied Knowledge**

1. Identifying features and uses of a full range of computer hardware used in the planning function.
2. Standards and requirements of caring for and maintaining computer hardware.
3. Indicators of equipment failure and the required actions to deal with it.
4. Vendor procedures for starting up, maintaining and shutting down computer hardware.
5. Organisation specific security arrangements.

### **Given:**

Given a fully equipped planning work station. Be able to:

### **Practical Skills Activities:**

1. Identify all the computer components and describe the uses for each of the components.
2. Conduct a pre-use check on the hardware to ensure that everything is correctly connected and in operational order.
3. Start up the computer systems and access the various computer programmes and networks.
- 4.

### **Internal Assessment:**

1. Test understanding of the applied knowledge checking that the learner understands the importance of properly caring for computer equipment.
2. Observe the extent to which the learner follows the prescribed procedures to check and start up the computer equipment.
3. Observe the extent to which the learner follows the appropriate procedures to start up and shut down the computer work station.

## **PRACTICAL SKILL: Create documents, presentations and spreadsheets using processing software. (Credits: 4)**

### **Applied Knowledge**

1. Principles and techniques of writing good reports and memos.
2. Techniques of operating the various software packages.
3. Basic principles of building spreadsheets and manipulating data.

#### 4. Techniques of creating effective presentation material.

**Given:**

Given a functioning computer with valid word processing software packages, hand written memos, notes of meetings and raw data. Be able to.

**Practical Skills Activities:**

1. Produce memos and reports and send them via an internet and e-mail system.
2. Produce basic spreadsheets, manipulate the data in the spreadsheets and produce relevant graphs depicting the information in the spreadsheets.
3. Produce basic presentation material.

**Internal Assessment:****PRACTICAL SKILL: Read and interpret a mine plan (Credits: 8)****Applied Knowledge****Given:**

Given a completed mine and geological plan, a plan of specific workings (stope sheet as well as production plans and results and relevant services department reports for a work area. Be able to:

**Practical Skills Activities:**

1. Calculate volumes, tonnes, and face advance (distances) using the mine plan.
2. Plot and update the section plan with the production information.
3. Interpret the mine and geology plan and describe the implications of the conditions on the mine plan related to the specific working area in terms of safety and production.
4. Identify and describe: a. All geological features indicated on the plan; b. all infrastructures indicated on the plan; c. Identify the direction and coordinates on the plan d. Distinguish the elevation and gradient (dip and strike) e. Identify the boundaries and pillars f. Identify the types of excavations (shafts, sub shafts, drives cross-cuts, drives, traveling ways. g. Identify the position of survey pegs and stations. h. Identify restricted areas and abandoned workings. i. Identify all dams. j. Lines indicating the planes of sections; k. Water plugs l. Falls of ground. m. Ventilation districts. n. Harmful gas intersections. o. Economically mineable areas.
5. Identify and describe possible areas where the current planning can be improved.

**Internal Assessment:**

1. APPLIED KNOWLEDGE: Test understanding of the concepts and principles of mine survey. (a. Definition and purpose of the different types of mine plans (1:1000, 1:200), b. Legal requirements covered on the various mine plans (including survey notes, holing notes, start up notes. c. Plan layout and all symbols and signage used on mine plans d. Implication of non adherence to requirements on mine plans
2. Evaluate that all features and orientations on the plan are correctly identified and described. (Features as indicated on the plan)
3. Evaluate the accuracy of the interpretation and that all the implications set out in the given scenario related to safety and production have been identified and correctly described.
4. Observe the process of plotting and updating the plan checking accuracy, neatness and completeness.

5. Evaluate that all calculations are correctly done.

**PRACTICAL SKILL: Conduct basic mine planning tasks by hand and by computer. (Credits: 16)**

**Applied Knowledge**

**Given:**

Given an appropriate mine planning systems and tools, scenarios of a range of different mine planning situations, requirements and production results be able to:

**Practical Skills Activities:**

1. Construct sections
2. Construct basic mining layouts.
3. Calculate tonnages and metal contents using given planning parameters.
4. Draft a basic mine plan and production schedule for a mining block.

**Internal Assessment:**

1. Test understanding of the applied knowledge.
2. Evaluate the extent to which the layouts are done according to the given rules.
3. Evaluate the correctness of the constructed sections and the accuracy of all relevant calculations.
4. Evaluate the feasibility of the produced schedules.

**PRACTICAL SKILL: Read and interpret sampling sheets (Credits: 4)**

**Applied Knowledge**

1. Purpose and use of sampling data and its implication for planning.

**Given:**

Given a range of sample sheets and related sampling data. Be able to:

**Practical Skills Activities:**

1. Interpret the sample sheet
2. Execute basic calculations on grade and width.
3. Plot the information of the stoping and development sheets.

**Internal Assessment:**

1. Test understanding of the applied knowledge.
2. Evaluate the accuracy of the calculations.
3. Evaluate the relevance of the interpretation of the sample sheets.
4. Evaluate the completeness and accuracy of the plotted information.

**Provider Accreditaion Requirements:**

**Physical Requirements:**

**Human Resources Requirements:**

**Legal Requirements:**



# Section 3C: Work Experience Module Specifications

Number	Title	NQF Level	Credits
311701-0021-WM-01	Mine planning processes		93

Total Work Experience Credits: **93**

**Work Experience Module Specification Number:** 311701-0021-WM-01

**Work Experience Module Specification Title:** Mine planning processes

## Purpose of the Module

**WORK EXPERIENCE:** 1. Observe the full mining cycle for a period of one production month.

### Contextual Workplace Experience

1. All mining standards that are relevant to mining layouts and production planning.
2. Mine specific mining cycles and production targets and productivity standards.

### Guidelines for Work Experience

1. Observe the work done, by all team members, at all stages of the stope life cycle (Raise, ledge, equip, stope, reclaim)
2. Observe and identify the typical constraints associated with the daily work cycles in stoping.
3. Observe and identify the typical constraints associated with the daily work cycles in development.
4. Observe the management processes taking place over a full production month for both stoping and development.

### Supporting Evidence

1. Learner developed report indicating the constraints and planning implications of each of the observed work activities.
2. Sign off by the Production Mine Overseer that the learner was exposed to all the relevant mining activities.
3. Sign off by the Mine Overseer that the learner gained an adequate understanding of the identified policies, procedures and standards.

**WORK EXPERIENCE:** 2. Observe the operation of the maintenance functions on the mine.

### Contextual Workplace Experience

1. Mine Specific planned maintenance policies and procedures.
2. Mine specific breakdown processes, procedures and documents.

### Guidelines for Work Experience

1. Observe the full range of planning activities executed by the Engineering Planning function.
2. Observe the work executed in the maintenance workshops and transport section and record the key implications of these functions on mine planning.
3. Visit the key engineering installations on the mine and note any aspects regarding the operations of these installations that impact on the mine planning processes.

4. Visit the control room and observe the key functions executed there.

### **Supporting Evidence**

1. Learner developed report in the form of a work book with specific answers to relevant questions.
2. Sign off by the Engineer that the learner was adequately exposed to the critical engineering installations.
3. Sign off by the Engineer that the learner understands the identified policies, procedures and standards.

**WORK EXPERIENCE:** 3. Observe the work of the Occupational Health and safety function on the mine.

### **Contextual Workplace Experience**

1. Mine specific roles and responsibilities of the OHS safety representative.
2. Mine specific OHS policy and safety rules.

### **Guidelines for Work Experience**

1. Observe the inspection work that the OHS practitioner does.
2. Observe the record keeping and reporting processes that take place in the OHS function.
3. Attend safety meetings at different levels in the organisation and record any issues relevant to mine planning.

### **Supporting Evidence**

1. Learner produced report of the roles and responsibilities of the OHS function
2. Sign off by the OHS manager that the learner was exposed to all OHS issues relevant to mine planning.
3. List of the typical accidents and incidents that are caused by poor or insufficient planning.

**WORK EXPERIENCE:** 4. Access and operate mine specific technical mine planning systems.

### **Contextual Workplace Experience**

### **Guidelines for Work Experience**

1. Do basic mining designs and layouts using the mine specific planning system.
2. Develop stoping and development schedules using the mine specific planning system.
3. Draw a range of reports regarding plans and progress against plans.
4. Extract from the system daily and monthly production reports and graphs.
5. Access the mine specific planning systems and correct plans and schedules where required.
6. File, store and access hard copies of the various documents used in the planning function.
7. Interface with other service departments through the mine specific planning system to ensure that all relevant information is updated.

### **Supporting Evidence**

1. A range of short term mine plans signed off by a competent mine planning practitioner.
2. A range of stoping and development schedules signed off by a competent mine planning practitioner.
3. Correct reports drawn from the system within a reasonable time period.
4. Senior manager in the Mine Planning function signs off that the learner was adequately exposed to all the relevant functions of the mine specific planning system.

**WORK EXPERIENCE:** 5. Assist with the collection of data for mine planning meetings.

### **Contextual Workplace Experience**

1. Mine specific planning standards and protocols.
2. Detailed understanding of the mine organisational structure and who the various players are.

### **Guidelines for Work Experience**

1. Update short term plans on the system and prepare them for the planning meeting.
2. Collect and collate the production data from the previous month and capture it in a mine specific template spreadsheet.
3. Prepare the meeting venue and make sure that all required resources are available.
4. Prepare, distribute and collect meeting attendance lists, minutes and meeting packs.
5. Produce graphs indicating the variances between plan and actual production.
6. Capture and distribute the minutes of the planning meetings.
7. Observe and participate in the daily planning activities during the month.

### **Supporting Evidence**

1. All information available for planning meetings.
2. Sign off by Snr. Production Manager that all meeting logistics was adequately and efficiently organised by the learner.
3. Availability of accurate minutes of meetings.

**WORK EXPERIENCE:** 6. Assist the mine surveyor with measuring and plotting.

### **Contextual Workplace Experience**

### **Guidelines for Work Experience**

1. Observe the mine surveyor conducting the face measurement processes.
2. Take a number of face measurements using the various pieces of equipment.
3. Observe the Surveyor plotting or digitising the measurements on the mine plans.

### **Supporting Evidence**

1. Sign off by a competent Surveyor that the learner was adequately exposed to all the relevant measuring and plotting processes.

**WORK EXPERIENCE:** 7. Observe the sampling processes.

### **Contextual Workplace Experience**

1. Mine specific sampling protocols and procedures
2. Mine specific grade control procedures.

### **Guidelines for Work Experience**

1. Observe the taking of samples from a range of different working areas.
2. Observe the processing of samples in the laboratory.
3. Assist the sampler to complete the required documentation and process the sampling information.
4. Observe the procedure used to implement grade control.

### **Supporting Evidence**

1. Sign off by the grade officer that the learner was adequately exposed to the total sampling process.

### **Criteria for Workplace Approval:**

**Physical Requirements:**

**Human Resources Requirements:**

**Legal Requirements:**