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Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

SOIL SCIENCE

NQF Level 3

September 2007

SOIL SCIENCE – LEVEL 3

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SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides the lecturer with guidelines to develop and implement a coherent, integrated assessment system for Soil Science in the National Certificates (Vocational). It must be read with the *National Policy Regarding Further Education and Training Programmes: Approval of the Documents, Policy for the National Certificates (Vocational) Qualifications at Levels 2 to 4 on the National Qualifications Framework (NQF)*. This assessment guideline will be used for National Qualifications Framework Levels 2-4.

This document explains the requirements for the internal and external subject assessment. The lecturer must use this document with the *Subject Guidelines: Soil Science (Levels 2 and 3)* and *Farm Planning and Mechanisation (Level 4)* to prepare for and deliver Soil Science and Farm Planning and Mechanisation. Lecturers should use a variety of resources and apply a range of assessment skills in the setting, marking and recording of assessment tasks.

SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

1 ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

Assessment in the National Certificates (Vocational) is underpinned by the objectives of the National Qualifications Framework (NQF). These objectives are to:

- Create an integrated national framework for learning achievements.
- Facilitate access to and progression within education, training and career paths.
- Enhance the quality of education and training.
- Redress unfair discrimination and past imbalances and thereby accelerate employment opportunities.
- Contribute to the holistic development of the student by addressing:
  - social adjustment and responsibility;
  - moral accountability and ethical work orientation;
  - economic participation; and
  - nation-building.

The principles that drive these objectives are:

- ***Integration***

To adopt a unified approach to education and training that will strengthen the human resources development capacity of the nation.

- ***Relevance***

To be dynamic and responsive to national development needs.

- ***Credibility***

To demonstrate national and international value and recognition of qualification and acquired competencies and skills.

- ***Coherence***

To work within a consistent framework of principles and certification.

- ***Flexibility***

To allow for creativity and resourcefulness when achieving Learning Outcomes, to cater for different learning styles and use a range of assessment methods, instruments and techniques.

- ***Participation***

To enable stakeholders to participate in setting standards and co-ordinating the achievement of the qualification.

- ***Access***

To address barriers to learning at each level to facilitate students' progress.

- ***Progression***

To ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system.

- ***Portability***

To enable students to transfer credits of qualifications from one learning institution and/or employer to another institution or employer.

- ***Articulation***

To allow for vertical and horizontal mobility in the education system when accredited pre-requisites have been successfully completed.

- ***Recognition of Prior Learning***

To grant credits for a unit of learning following an assessment or if a student possesses the capabilities specified in the outcomes statement.

- ***Validity of assessments***

To ensure assessment covers a broad range of knowledge, skills, values and attitudes (SKVAs) needed to demonstrate applied competency. This is achieved through:

  - clearly stating the outcome to be assessed;
  - selecting the appropriate or suitable evidence;
  - matching the evidence with a compatible or appropriate method of assessment; and
  - selecting and constructing an instrument(s) of assessment.

- ***Reliability***

To assure assessment practices are consistent so that the same result or judgment is arrived at if the assessment is replicated in the same context. This demands consistency in the interpretation of evidence; therefore, careful monitoring of assessment is vital.

- ***Fairness and transparency***

To verify that no assessment process or method(s) hinders or unfairly advantages any student. The following could constitute unfairness in assessment:

  - Inequality of opportunities, resources or teaching and learning approaches
  - Bias based on ethnicity, race, gender, age, disability or social class
  - Lack of clarity regarding Learning Outcome being assessed
  - Comparison of students' work with other students, based on learning styles and language

- ***Practicability and cost-effectiveness***

To integrate assessment practices within an outcomes-based education and training system and strive for cost and time-effective assessment.

2 ASSESSMENT FRAMEWORK FOR VOCATIONAL QUALIFICATIONS

The assessment structure for the National Certificates (Vocational) qualification is as follows:

2.1 Internal continuous assessment (ICASS)

Knowledge, skills values, and attitudes (SKVAs) are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. The internal continuous assessment (ICASS) practical component is undertaken in a real workplace, a workshop or a "Structured Environment". This component is moderated internally and externally quality assured by Umalusi. All internal continuous assessment (ICASS) evidence is kept in a Portfolio of Evidence (PoE) and must be readily available for monitoring, moderation and verification purposes.

2.2 External summative assessment (ESASS)

The external summative assessment is either a single or a set of written papers set to the requirements of the Subject Learning Outcomes. The Department of Education administers the theoretical component according to relevant assessment policies.

A compulsory component of external summative assessment (ESASS) is the **integrated summative assessment task (ISAT).** This assessment task draws on the students' cumulative learning throughout the year. The task requires **integrated application of competence** and is executed under strict assessment conditions. The task should take place in a simulated or "Structured Environment". The integrated summative assessment task (ISAT) is the most significant test of students' ability to apply their acquired knowledge.

The integrated assessment approach allows students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

External summative assessments will be conducted annually between October and December, with provision made for supplementary sittings.

3 MODERATION OF ASSESSMENT

3.1 Internal moderation

Assessment must be moderated according to the internal moderation policy of the Further Education and Training (FET) college. Internal college moderation is a continuous process. The moderator's involvement starts with the planning of assessment methods and instruments and is followed by continuous collaboration with and support to the assessors. Internal moderation creates common understanding of Assessment Standards and maintains these across vocational programmes.

3.2 External moderation

External moderation is conducted by the Department of Education, Umalusi and, where relevant, an Education and Training Quality Assurance (ETQA) body according to South African Qualifications Authority (SAQA) and Umalusi standards and requirements.

The external moderator:

- monitors and evaluates the standard of all summative assessments;
- maintains standards by exercising appropriate influence and control over assessors;
- ensures proper procedures are followed;
- ensures summative integrated assessments are correctly administered;
- observes a minimum sample of ten (10) to twenty-five (25) percent of summative assessments;
- gives written feedback to the relevant quality assuror; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures for students who experience barriers to learning be customised and supported to enable these students to achieve their maximum potential.

4 PERIOD OF VALIDITY OF INTERNAL CONTINUOUS ASSESSMENT (ICASS)

The period of validity of the internal continuous assessment mark is determined by the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificates (Vocational).*

The internal continuous assessment (ICASS) must be re-submitted with each examination enrolment for which it constitutes a component.

5 ASSESSOR REQUIREMENTS

Assessors must be subject specialists and should ideally be declared competent against the standards set by the ETDP SETA. If the lecturer conducting the assessments has not been declared a competent assessor, an assessor who has been declared competent may be appointed to oversee the assessment process to ensure the quality and integrity of assessments.

6 TYPES OF ASSESSMENT

Assessment benefits the student and the lecturer. It informs students about their progress and helps lecturers make informed decisions at different stages of the learning process. Depending on the intended purpose, different types of assessment can be used.

6.1 Baseline assessment

At the beginning of a level or learning experience, baseline assessment establishes the knowledge, skills, values and attitudes (SKVAs) that students bring to the classroom. This knowledge assists lecturers to plan learning programmes and learning activities.

6.2 Diagnostic assessment

This assessment diagnoses the nature and causes of learning barriers experienced by specific students. It is followed by guidance, appropriate support and intervention strategies. This type of assessment is useful to make referrals for students requiring specialist help.

6.3 Formative assessment

This assessment monitors and supports teaching and learning. It determines student strengths and weaknesses and provides feedback on progress. It determines if a student is ready for summative assessment.

6.4 Summative assessment

This type of assessment gives an overall picture of student progress at a given time. It determines whether the student is sufficiently competent to progress to the next level.

7 PLANNING ASSESSMENT

An assessment plan should cover three main processes:

7.1 Collecting evidence

The assessment plan indicates which Subject Outcomes and Assessment Standards will be assessed, what assessment method or activity will be used and when this assessment will be conducted.

7.2 Recording

Recording refers to the assessment instruments or tools with which the assessment will be captured or recorded. Therefore, appropriate assessment instruments must be developed or adapted.

7.3 Reporting

All the evidence is put together in a report to deliver a decision for the subject.

8 METHODS OF ASSESSMENT

Methods of assessment refer to who carries out the assessment and includes lecturer assessment, self-assessment, peer assessment and group assessment.

LECTURER ASSESSMENT	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
SELF-ASSESSMENT	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
PEER ASSESSMENT	Students assess another student's or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
GROUP ASSESSMENT	Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.

9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE

All evidence collected for assessment purposes is kept or recorded in the student's Portfolio of Evidence (PoE).

The following table summarises a variety of methods and instruments for collecting evidence. A method and instrument is chosen to give students ample opportunity to demonstrate the Subject Outcome has been attained. This will only be possible if the chosen methods and instruments are appropriate for the target group and the Specific Outcome being assessed.

	METHODS FOR COLLECTING EVIDENCE		
	Observation-based (Less structured)	**Task-based** (Structured)	**Test-based** (More structured)
Assessment instruments	• Observation • Class questions • Lecturer, student, parent discussions	• Assignments or tasks • Projects • Investigations or research • Case studies • Practical exercises • Demonstrations • Role-play • Interviews	• Examinations • Class tests • Practical examinations • Oral tests • Open-book tests
Assessment tools	• Observation sheets • Lecturer's notes • Comments	• Checklists • Rating scales • Rubrics	• Marks (e.g. %) • Rating scales (1-7)
Evidence	• Focus on individual students • Subjective evidence based on lecturer observations and impressions	**Open middle**: Students produce the same evidence but in different ways. **Open end**: Students use same process to achieve different results.	Students answer the same questions in the same way, within the same time.

10 TOOLS FOR ASSESSING STUDENT PERFORMANCE

Rating scales are marking systems where a symbol (such as 1 to 7) or a mark (such as 5/10 or 50%) is defined in detail. The detail is as important as the coded score. Traditional marking, assessment and evaluation mostly used rating scales without details such as what was right or wrong, weak or strong, etc.

Task lists and **checklists** show the student what needs to be done. These consist of short statements describing the expected performance in a particular task. The statements on the checklist can be ticked off when the student has adequately achieved the criterion. Checklists and task lists are useful in peer or group assessment activities.

Rubrics are a hierarchy (graded levels) of criteria with benchmarks that describe the minimum level of acceptable performance or achievement for each criterion. Using rubrics is a different way of assessing and cannot be compared to tests. Each criterion described in the rubric must be assessed separately. Mainly, two types of rubrics, namely holistic and analytical, are used.

11 SELECTING AND/OR DESIGNING RECORDING AND REPORTING SYSTEMS

The selection or design of recording and reporting systems depends on the purpose of recording and reporting student achievement. **Why** particular information is recorded and **how** it is recorded determine which instrument will be used.

Computer-based systems, for example spreadsheets, are cost and time effective. The recording system should be user-friendly and information should be easily accessed and retrieved.

12 COMPETENCE DESCRIPTIONS

All assessment should award marks to evaluate specific assessment tasks. However, marks should be awarded against rubrics and not be simply a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) a student must demonstrate to achieve each level of the rating scale.

When lecturers or assessors prepare an assessment task or question, they must ensure that the task or question addresses an aspect of a Subject Outcome. The relevant Assessment Standard must be used to create the rubric to assess the task or question. The descriptions must clearly indicate the minimum level of attainment for each category on the rating scale.

13 STRATEGIES FOR COLLECTING EVIDENCE

A number of different assessment instruments may be used to collect and record evidence. Examples of instruments that can be (adapted and) used in the classroom include:

13.1 Record sheets

The lecturer observes students working in a group. These observations are recorded in a summary table at the end of each project. The lecturer can design a record sheet to observe students' interactive and problem-solving skills, attitudes towards group work and involvement in a group activity.

13.2 Checklists

Checklists should have clear categories to ensure that the objectives are effectively met. The categories should describe how the activities are evaluated and against what criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN SOIL SCIENCE

1 SCHEDULE OF ASSESSMENT

At NQF levels 2, 3 and 4, lecturers will conduct assessments as well as develop a schedule of formal assessments that will be undertaken in the year. All three levels also have an external examination that accounts for 50 percent of the total mark. The marks allocated to assessment tasks completed during the year, kept or recorded in a Portfolio of Evidence (PoE), account for the other 50 percent.

The Portfolio of Evidence (PoE) and the external assessment include practical and written components. The practical assessment in Soil Science must, where necessary, be subjected to external moderation by Umalusi or an appropriate Education and Training Quality Assurance (ETQA) body, appointed by the Umalusi Council in terms of Section 28(2) of the *General and Further Education and Training Quality Assurance Act, 2001 (Act No. 58 of 2001).*

2 RECORDING AND REPORTING

Soil Science and Farm Planning and Mechanisation, as is the case for all the other Vocational subjects, is assessed according to five levels of competence. The level descriptions are explained in the following table.

Scale of Achievement for the Vocational component

RATING CODE	RATING	MARKS %
5	Outstanding	80-100
4	Highly competent	70-79
3	Competent	50-69
2	Not yet competent	40-49
1	Not achieved	0-39

The programme of assessment should be recorded in the Lecturer's Portfolio of Assessment for each subject. The following at least should be included in the Lecturer's Assessment Portfolio:

- A contents page
- The formal schedule of assessment
- The requirements for each assessment task
- The tools used for each assessment task
- Recording instrument(s) for each assessment task
- A mark sheet and report for each assessment task

The college must standardise these documents.

The student's Portfolio of Evidence (PoE) must include at least:

- A contents page
- The assessment tasks according to the assessment schedule
- The assessment tools or instruments for the task
- A record of the marks (and comments) achieved for each task

Where a task cannot be contained as evidence in the Portfolio of Evidence (PoE), its exact location must be recorded and it must be readily available for moderation purposes.

ASSESSMENT OF SOIL SCIENCE

LEVEL 3

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN SOIL SCIENCE - LEVEL 3

Topic 1: Fertilization of soils

SUBJECT OUTCOME	
1.1 Identify essential elements in fertilizers and explain limiting factors	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Essential elements identified, limiting factors explained.	• Explain the principle of "limiting factors". • List the available sources of macro- and micro-nutrients. • Describe deficiency symptoms in crop plants. *Range: Common examples in southern Africa*. • Explain the concept of mixed fertilizers and describe and use methods of applying solid fertilizers. *Range: Methods of application are hand placing or broadcasting*.
ASSESSMENT TASKS OR ACTIVITIES	
• Practical work done and written up. • Oral explanation and group discussion, in context of practical work. • Assignments and short tests.	

SUBJECT OUTCOME	
1.2 Explain and demonstrate the use of organic fertilizers, and explain the advantages and disadvantages of organic and inorganic fertilizers. *Range: Organic fertilizers refer to animal manure, compost and green manure.*	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Use of organic fertilizers explained and demonstrated, and advantages and disadvantages of organic and inorganic fertilizers explained.	• Explain the storage, treatment, management and application of animal manure and compost. • Explain what plants are suitable for green manuring, their benefits and their problems. • Explain the advantages and disadvantages of organic and inorganic fertilizers, including their impact on soil micro-organisms and soil acidity.
ASSESSMENT TASKS OR ACTIVITIES	
• Practical work done and written up. • Oral explanation and group discussion, in context of practical work. • Assignments and short tests.	

SUBJECT OUTCOME	
1.3 Explain what is meant by problem soils and explain the properties of each. *Range: Problem soils refer to acidic, alkaline and sodic soils.*	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Problem soils and their properties explained.	• Explain the causes of acidic, alkaline and sodic soils. • Explain and demonstrate methods of determining the pH of soil. • Describe the treatment of acid, alkaline and sodic soils and their management.
ASSESSMENT TASKS OR ACTIVITIES	
• Practical work done and written up. • Oral explanation and group discussion, in context of practical work. • Assignments and short tests.	

SUBJECT OUTCOME	
1.4 From soil analysis results, calculate fertilizer requirements to influence harvest.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Fertilizer requirements calculated from soil analysis results.	• Collect samples from the field following set procedures. • Interpret soil sample results in order to calculate fertilizer requirements of a soil, as nutrient and fertilizer applications per hectare or square meter.
ASSESSMENT TASKS OR ACTIVITIES	
• Practical work done and written up. • Oral explanation and group discussion, in context of practical work. • Assignments and short tests.	

Topic 2: Soil water and evapotranspiration

SUBJECT OUTCOMES	
2.1 Explain the forms of soil water and evapotranspiration	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Forms of soil water, and evapotranspiration, explained.	• Explain soil water types, soil water movement, field capacity, and capillary movement. • Explain evapotranspiration, and evaporation control by mulches. *Range: Potential evapotranspiration, and calculations based on it, not required*.
ASSESSMENT TASKS OR ACTIVITIES	
• Practical work done and written up. • Oral explanation and group discussion, in context of practical work. • Assignments and short tests.	

SUBJECT OUTCOMES	
2.2 Calculate irrigation requirements	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Amounts of water required for irrigation are calculated.	Given areas of land and the amount of precipitation for which irrigation must substitute, calculate the amount of water needed in sprinkler irrigation.
ASSESSMENT TASKS OR ACTIVITIES	
Assignments and short tests.	

Topic 3: Soil erosion and its prevention

SUBJECT OUTCOME	
3.1 Explain the causes of soil erosion, its main forms and consequences.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Causes, main forms and consequences of soil erosion are explained.	Explain the following. • The basic factors affecting the amount of erosion (intensity and duration of rainfall, vegetation or equivalent cover, steepness and length of slope and erodability of the particular soil). *Range: Quantitative treatment, and calculations using the universal soil loss equation, not required.* • Indicators of erosion, using examples. • The impact of erosion on the soil profile depth, soil fertility and plant production.
ASSESSMENT TASKS OR ACTIVITIES	
• Oral explanation and group discussion, in context of simulation. • Assignments and short tests.	

SUBJECT OUTCOME	
3.2 Explain preventative measures for soil erosion.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
Preventative and treatment measures explained	Explain different preventative and treatment measures. *Range: Includes control of grazing, cover crops and mulching, contour ploughing, ridging and terracing and measures to combat gully erosion.*
ASSESSMENT TASKS OR ACTIVITIES	
• Illustrations provided and practical work done as appropriate. • Oral explanation and group discussion, in context of practical work. • Assignments and short tests.	

4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN SOIL SCIENCE - LEVEL 3

4.1 Integrated Summative Assessment Task (ISAT)

A compulsory component of ESASS is the **Integrated Summative Assessment Task (ISAT),** which is a major assessment task that draws on the learners' cumulative learning achieved throughout the full year. The task requires ***integrated application of competence*** and is executed and recorded in compliance with assessment conditions.

The ISAT may include practical components with specimens and pictures as well as questions asking for analysis of problems and designing of plans and other solutions. Although the nature of the tasks will be indicated in advance, the exact data involved, on the basis of which candidates' skills will be tested, will only be provided during the assessment session which will be under controlled conditions like an examination.

Although learners will have achieved the competencies through the year, the competencies will be assessed cumulatively in a single assessment / exam session at the end of the year)

The ISAT will be set by the externally appointed examiner and be conveyed to colleges within the first quarter of each year.

The integrated assessment approach allows for the learner to be assessed in more than one subject within the same ISAT.

4.2 National examination

A national examination is conducted annually in October or November by means of a paper set externally and marked and moderated externally. The following distribution of cognitive application is suggested

	KNOWLEDGE AND COMPREHENSION	APPLICATION	ANALYSIS, SYNTHESIS AND EVALUATION
LEVEL 3	40%	40%	20%