



**education**

Department:  
Education  
REPUBLIC OF SOUTH AFRICA

# **NATIONAL CERTIFICATES (VOCATIONAL)**

## **ASSESSMENT GUIDELINES**

### **ENGINEERING TECHNOLOGY**

#### **NQF LEVEL 2**

September 2007



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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 Engineering Technology 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: Engineering Technology* to prepare for and deliver Engineering Technology, Materials Technology and Professional Engineering Practice. 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 follows with 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 assessor; 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.

<b>LECTURER ASSESSMENT</b>	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
<b>SELF-ASSESSMENT</b>	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
<b>PEER ASSESSMENT</b>	Students assess another student or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
<b>GROUP ASSESSMENT</b>	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)
<b>Assessment instruments</b>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Class questions</li> <li>• Lecturer, student, parent discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Assignments or tasks</li> <li>• Projects</li> <li>• Investigations or research</li> <li>• Case studies</li> <li>• Practical exercises</li> <li>• Demonstrations</li> <li>• Role-play</li> <li>• Interviews</li> </ul>	<ul style="list-style-type: none"> <li>• Examinations</li> <li>• Class tests</li> <li>• Practical examinations</li> <li>• Oral tests</li> <li>• Open-book tests</li> </ul>
<b>Assessment tools</b>	<ul style="list-style-type: none"> <li>• Observation sheets</li> <li>• Lecturer's notes</li> <li>• Comments</li> </ul>	<ul style="list-style-type: none"> <li>• Checklists</li> <li>• Rating scales</li> <li>• Rubrics</li> </ul>	<ul style="list-style-type: none"> <li>• Marks (e.g. %)</li> <li>• Rating scales (1-7)</li> </ul>
<b>Evidence</b>	<ul style="list-style-type: none"> <li>• Focus on individual students</li> <li>• Subjective evidence based on lecturer observations and impressions</li> </ul>	<p><b>Open middle:</b> Students produce the same evidence but in different ways.</p> <p><b>Open end:</b> Students use same process to achieve different results.</p>	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. They 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. It is a different way of assessment 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 simply be 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 ENGINEERING TECHNOLOGY

### 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 Engineering Technology 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

Engineering Technology, 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 should at least 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 at least include:

- 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 tasks 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 ENGINEERING TECHNOLOGY**  
**LEVEL 2**

### 3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN ENGINEERING TECHNOLOGY – LEVEL 2

#### Topic 1: Engineering Hand Tools

SUBJECT OUTCOME	
<b>Select engineering hand tools.</b>	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>• Different hand tools are listed.</li> <li>• Parts of the hand tools are identified.</li> <li>• The uses of the hand tools are discussed.</li> <li>• The best hand tool for a specific task is selected.</li> </ul>	<ul style="list-style-type: none"> <li>• List different hand tools used in manufacturing, engineering and technology.</li> <li>• Identify parts of the selected engineering hand tools.</li> <li>• Discuss the use(s) or functions of each selected engineering hand tool.</li> <li>• Decide on the best hand tool for a specific task.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Written tests and assignment on selection of hand tools</li> <li>• Group discussion on uses of hand tools</li> <li>• Assignment on selection of tools for a specific task</li> </ul>	

SUBJECT OUTCOME	
<b>Use engineering hand tools.</b>	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>• The safe use of engineering hand tools is discussed and the consequences of incorrect use are recorded.</li> <li>• A malfunctioning hand tool is identified.</li> <li>• The safe use of hand tools is demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the importance of using engineering hand tools safely.</li> <li>• Record the consequences of using engineering hand tools incorrectly.</li> <li>• Explain how a malfunctioning hand tool can be identified during use.</li> <li>• Demonstrate the safe use of engineering hand tools to meet the task requirements.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Written test, group discussion and a record of incorrect uses is drawn up</li> <li>• Task on identifying malfunctioning tools</li> <li>• Practical assignment and written test on use of hand tools</li> </ul>	

SUBJECT OUTCOME	
<b>Care for engineering hand tools.</b>	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>• Factors to consider when caring for and maintaining hand tools are listed.</li> <li>• Faulty hand tools are identified and reported and corrective action is taken.</li> <li>• Consequences of improper care and storage of hand tools are explained.</li> </ul>	<ul style="list-style-type: none"> <li>• List factors to consider when caring for and maintaining hand tools.</li> <li>• Identify and report faulty hand tools and take corrective action.</li> <li>• Explain the consequences of improper care and storage of engineering hand tools.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Written test on factors to consider when caring for hand tools</li> <li>• Written test and practical assignment on faulty tools</li> <li>• Written test and assignment on improper care and storage of hand tools</li> </ul>	

## Topic 2: Engineering Power Tools

SUBJECT OUTCOME	
<b>Select engineering power tools (electrical, hydraulic and pneumatic).</b>	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>• Different power tools are listed and the parts are identified.</li> <li>• The use of power tools is discussed and the best one is selected for a specific task.</li> </ul>	<ul style="list-style-type: none"> <li>• List different power tools used in manufacturing, engineering and technology fields.</li> <li>• Identify parts of the selected engineering power tools.</li> <li>• Discuss the use(s) or functions of each select engineering power tool.</li> <li>• Decide on the best power tool for a specific task.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>• Written test and assignment on power tools and their parts</li> <li>• Assignment on the use of power tools</li> <li>• Written test and assignment on use of power tools</li> </ul>	

SUBJECT OUTCOME	
<b>Use engineering power tools.</b>	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>• Safety measures to be taken when using power tools are listed.</li> <li>• The importance of following the manufacturer's recommendations is discussed.</li> <li>• Power tools are used correctly and safely and accurately.</li> </ul>	<ul style="list-style-type: none"> <li>• List the safety measures to be taken when using different power tools.</li> <li>• Discuss the importance of following the manufacturer's recommendations when working with various power tools.</li> <li>• Use power tools safely, correctly and accurately.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>• Group discussion on manufacturer's recommendations</li> <li>• Practical assignment using the power tools</li> </ul>	

SUBJECT OUTCOME	
<b>Maintain and care for engineering power tools.</b>	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>• Elements to consider when maintaining and caring for power tools are listed.</li> <li>• Power tool checks and inspections are made.</li> <li>• Power tools are lubricated.</li> </ul>	<ul style="list-style-type: none"> <li>• List all elements to consider when maintaining and caring for power tools.</li> <li>• Demonstrate the ability to check power supplies to power tools.</li> <li>• Inspect various power tools for defects.</li> <li>• Lubricate power tools according to the manufacturer's recommendations.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>• Written test on elements</li> <li>• Practical assignment on power tool checks and inspections</li> <li>• Practical task on lubrication</li> </ul>	

## Topic 3: Engineering Measuring Equipment

SUBJECT OUTCOME	
<b>Select engineering measuring equipment.</b>	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>• A variety of measuring equipments are listed and their different parts are identified.</li> <li>• Functions of measuring tools are discussed and the</li> </ul>	<ul style="list-style-type: none"> <li>• List a variety of engineering measuring equipments.</li> <li>• Identify the different parts of measuring equipment.</li> <li>• Discuss the functions of each measuring tool.</li> </ul>

best one for a specific task is selected.	<ul style="list-style-type: none"> <li>Decide on the best measuring tool for a specific task.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test and assignment on measuring equipment and their parts</li> <li>Group discussion and reporting on functions of measuring tools</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Use engineering measuring equipment.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Safety precautions to be taken when using engineering measurement equipment are recorded.</li> <li>Measuring equipment is employed safely and accurately.</li> </ul>	<ul style="list-style-type: none"> <li>Record safety precautions to be taken when using engineering measuring equipment.</li> <li>Employ engineering measuring equipment safely and accurately.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test on safety precautions</li> <li>Practical assignment and written test on engineering measuring equipment</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Care for and maintain engineering measuring equipment.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Elements to consider regarding the care of measuring equipment are listed and the consequences of improper care are explained.</li> <li>Measuring equipment maintenance is demonstrated.</li> <li>Measuring equipment is stored.</li> </ul>	<ul style="list-style-type: none"> <li>List all elements to consider when caring for and maintaining engineering measuring equipment.</li> <li>Explain the consequences of improper care for and storage of engineering measuring equipment.</li> <li>Demonstrate the ability to maintain engineering measuring equipment.</li> <li>Store engineering measuring equipment safely.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test and assignment on care and maintenance of engineering measuring equipment</li> <li>Practical assignment on maintenance and storage of measuring equipment</li> </ul>	

#### Topic 4: Engineering Precision Measuring Equipment

<b>SUBJECT OUTCOME</b>	
<b>Select engineering precision measuring equipment.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Precision measuring equipment is selected and their parts are identified.</li> <li>The functions of precision measuring equipment are discussed and the best one for a specific task is chosen.</li> </ul>	<ul style="list-style-type: none"> <li>Select engineering precision measuring equipment.</li> <li>Identify parts of the precision measuring equipment.</li> <li>Discuss the functions of precision measuring equipment.</li> <li>Decide on the best precision measuring equipment for a specific task.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test and assignment on precision measuring equipment</li> <li>Group discussion and task on precision measuring tools</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Use engineering precision measuring equipment.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Safety measures for using precision measuring equipment are listed.</li> </ul>	<ul style="list-style-type: none"> <li>List safety measures to be observed when using precision measuring equipment.</li> </ul>

<ul style="list-style-type: none"> <li>The use of precision measuring equipment is demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the use of engineering precision measuring equipment.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test on safety measures for precision measuring equipment</li> <li>Practical assignment on use of precision measuring equipment</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Care for and maintain precision measuring equipments.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Care factors for precision measuring equipment are listed and the equipment is maintained.</li> <li>Precision measuring equipment is stored.</li> </ul>	<ul style="list-style-type: none"> <li>List care and maintenance factors for precision measuring equipment.</li> <li>Maintain engineering precision measuring equipment.</li> <li>Store precision measuring equipment.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written and practical tasks on care and maintenance of equipment</li> <li>Practical assignment on storing of equipment</li> </ul>	

### Topic 5: SI Units of Measurement

<b>SUBJECT OUTCOME</b>	
<b>Demonstrate knowledge of basic SI units of measurement.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Basic units of measurements used in science engineering are identified.</li> <li>Physical quantities that are measured are defined.</li> </ul>	<ul style="list-style-type: none"> <li>Identify basic units of measurement used in science engineering.</li> <li>Define the physical quantities that are measured by the SI units.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test and assignments on basic SI units of measurements</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Convert between SI units.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Conversions are performed.</li> <li>New units are derived from relationships between the SI units.</li> </ul>	<ul style="list-style-type: none"> <li>Perform conversions according to relevant digital values.</li> <li>Derive new units from the relationships between the SI units (i.e. the quantities they measure).</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test and assignments on conversions of SI units</li> <li>Written assignments on new units</li> </ul>	

### Topic 6: Engineering Marking-off Equipment

<b>SUBJECT OUTCOME</b>	
<b>Select engineering marking-off equipment.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>Marking-off equipment is listed and compared and a specific piece of equipment is chosen for a specific task.</li> </ul>	<ul style="list-style-type: none"> <li>List marking-off equipment.</li> <li>Compare different marking-off equipments.</li> <li>Identify appropriate marking-off equipment for specific tasks.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>Written test and assignment on selecting marking-off equipment</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Use engineering marking-off equipments.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>• Safety precautions are discussed.</li> <li>• Marking-off equipment is applied safely and tested.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss safety precautions to be observed when using marking-off equipment.</li> <li>• Apply engineering marking-off equipment safely.</li> <li>• Test the working condition of marking-off equipment.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Group discussion on safety precautions</li> <li>• Practical task on application of marking-off equipment</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Care for engineering marking-off equipment.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>• Elements of caring for and maintenance of marking-off equipment are listed and the consequences of improper care are explained.</li> <li>• The ability to maintain marking-off equipment is demonstrated.</li> <li>• Marking-off equipment is stored.</li> </ul>	<ul style="list-style-type: none"> <li>• List all elements to consider when caring for and maintaining engineering marking-off equipment.</li> <li>• Explain the consequences of improper care for and storage of engineering marking-off equipment.</li> <li>• Demonstrate ability to maintain engineering marking-off equipment.</li> <li>• Store engineering marking-off equipment safely.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Assignments on the care for and maintenance of engineering marking-off equipment</li> <li>• Practical assignment where ability to maintain marking-off equipment is demonstrated</li> <li>• Practical assignment and written test on storing of marking-off equipment</li> </ul>	

### Topic 7: Basic Engineering Drawings

<b>SUBJECT OUTCOME</b>	
<b>Interpret and understand basic engineering drawings and sketches.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>• An understanding of terminology used in drawings is demonstrated.</li> <li>• The function and purpose of a drawing in terms of principles and practices are explained.</li> <li>• Knowledge and skills are applied to interpret drawings.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate an understanding of the terminology used in drawings.</li> <li>• Explain the function and purpose of a drawing in terms of engineering principles and practices.</li> <li>• Apply knowledge and skills to interpret drawings to translate their meanings into simple understanding.</li> </ul>
<b>ASSESSMENT TASKS OR ACTIVITIES</b>	
<ul style="list-style-type: none"> <li>• Written test, worksheets and assignments on interpreting and understanding drawings and sketches</li> </ul>	

<b>SUBJECT OUTCOME</b>	
<b>Apply basic engineering drawing practices.</b>	
<b>ASSESSMENT STANDARDS</b>	<b>LEARNING OUTCOMES</b>
<ul style="list-style-type: none"> <li>• Drawings are planned.</li> <li>• Border lines are drawn.</li> <li>• Construction lines are inserted.</li> <li>• The drawing or sketch is produced.</li> </ul>	<ul style="list-style-type: none"> <li>• Plan the drawing or reproduction appropriately to maximise page space.</li> <li>• Draw border lines neatly and accurately.</li> <li>• Insert construction lines to get an outline of the main drawing components.</li> <li>• Produce the drawing as per the scale or tolerances.</li> </ul>

ASSESSMENT TASKS OR ACTIVITIES
<ul style="list-style-type: none"> <li>Practical assignments and tests on basic drawing practice</li> </ul>

SUBJECT OUTCOME	
Produce drawings in two-dimensional views.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> <li>Knowledge of first and third-angle orthographic projection is applied.</li> <li>Understanding of isometric projections and principles is used.</li> </ul>	<ul style="list-style-type: none"> <li>Apply knowledge of first-angle and third-angle orthographic projection to produce the required drawing.</li> <li>Use understanding of isometric projections and principles to produce front, top and side views in two dimensions.</li> </ul>
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> <li>Practical assignments and written tests on producing drawings in two-dimensional views</li> </ul>	

#### 4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN ENGINEERING TECHNOLOGY – LEVEL 2

##### 4.1 Integrated summative assessment task (ISAT)

A compulsory component of the external assessment (ESASS) is the **integrated summative assessment task (ISAT)**. The integrated summative assessment task (ISAT) draws on the students' cumulative learning achieved throughout the year. The task requires **integrated application of competence** and is executed and recorded in compliance with assessment conditions.

Two approaches to the integrated summative assessment task (ISAT) may be as follows:

The students are assigned a task at the beginning of the year which they will have to complete in phases throughout the year to obtain an assessment mark. A final assessment is made at the end of the year when the task is completed.

OR

Students achieve the competencies throughout the year but the competencies are assessed cumulatively in a single assessment or examination session at the end of the year.

The integrated summative assessment task (ISAT) is set by an externally appointed examiner and is conveyed to colleges in the first quarter of the year.

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

##### 4.2 National Examination

A National Examination is conducted annually in October or November by means of a paper(s) set and moderated externally. The following distribution of cognitive application should be followed:

LEVEL 2	KNOWLEDGE AND COMPREHENSION	APPLICATION	ANALYSIS, SYNTHESIS AND EVALUATION
	50%	30%	20%

MARK ALLOCATION PER QUESTION		
<b>All questions are compulsory.</b>		
Three compulsory application questions covering all the topics. The questions must be integrated via a case study.		
Question 1:	Engineering Hand Tools	20 marks
Question 2:	Engineering Power Tools	20 marks
Question 3:	Engineering Measuring Equipment	15 marks

Question 4:	Engineering Precision Measuring Equipment	10 marks
Question 5:	SI Units of Measurement	10 marks
Question 6:	Engineering Marking-off Equipment	10 marks
Question 7:	Basic Engineering Drawing	15 marks
<b>TOTAL</b>		<b>100 marks</b>