education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

CONSTRUCTION PLANNING

NQF Level 2

April 2008

CONTENTS

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 Construction Planning 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: Construction Planning* to prepare for and deliver Construction Planning. 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 one student's work with another, 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 paper 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 assuror; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures be customised for students who experience barriers to learning, 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.

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 that the Subject Outcome has been attained. This will be possible only 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 (1-5)
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 5) 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. Use of rubrics provides a different way of assessing that 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) that 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 which criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN CONSTRUCTION PLANNING

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 the Portfolio of Evidence account for the other 50 percent.

The Portfolio of Evidence (PoE) and the external assessment include practical and written components. The practical assessment in Subject Name 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

Subject Name, 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 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 a task cannot be contained as evidence in the PoE, its exact location must be recorded and it must be readily available for moderation purposes.

The following units guide internal assessment in Construction Planning Level 2:

NUMBER OF UNITS	ASSESSMENT	COVERAGE
3	Formal written tests	One or more completed topics
1	Internal written exam	All completed topics
3	Practical assessments	Must cover the related Subject Outcomes

ASSESSMENT OF CONSTRUCTION PLANNING

LEVEL 2

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN CONSTRUCTION PLANNING – LEVEL 2

Topic 1: Terminology and components of the construction industry

SUBJECT OUTCOME	
1.1 Define terminology and components used in the construction industry.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Terminology used in the construction and building industry are defined *Range: building line, servitude, agreement certificate, registered home builder, owner builder, national building regulations, competent person, professional indemnity insurance, a specification, a standard, a tolerance and a contract document. (ISO 6707-1: Building and civil engineering – vocabulary: Part 1: General terms):*	• Define terms used in construction and building industry.
• All components and materials used when building a residential masonry house are identified and described.	• Identify and describe all components and materials used when building a residential masonry house.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations	

Topic 2: Measuring, setting out and levelling.

SUBJECT OUTCOME	
2.1 Describe and use measuring instruments	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• The concept “measuring” and the purpose of measuring are explained.	• Explain the concept “measuring” and indicate the purpose of measuring.
• Equipment and methods used for measuring are listed.	• List equipment and methods used for measuring.
• The correct usage and care of measuring tapes is explained and demonstrated.	• Explain and demonstrate the correct usage and care of measuring tapes.
• Ways to measure successive intervals from the zero mark are explained and demonstrated.	• Explain and demonstrate how to measure successive intervals from the zero mark.
• The benefits of using a stop to cut multiple lengths of material are explained.	• Explain the benefits of using a stop to cut multiple lengths of material.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations	

SUBJECT OUTCOME	
2.2 Describe, use and read verniers and micrometers	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• A vernier scale and a micrometer scale are described and correctly used.	• Describe and use a vernier scale and a micrometer scale correctly.
• Uses of vernier callipers and micrometers in construction are listed with examples *Range: glass and roof sheeting of the correct thickness, diameters of small drill bits, the pitch of a thread and the depth of a hole).*	• List, with examples, uses of vernier callipers and micrometers in construction.
• A vernier calliper is used to measure. *Range: Outside diameters (OD), inside diameters (ID) and depths.*	• Correctly use and read a vernier calliper for measurements.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations	

SUBJECT OUTCOME	
2.3 Explain, use and take care of setting out instruments.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• The concept “setting out” and the purpose of setting out are explained.	• Explain the concept “setting out” and indicate the purpose of setting out.
• Setting out instruments are listed and described *Range: spirit level, straightedge, a set square).*	• List and describe setting out instruments.
• The use and manner in which to check accuracy of setting out instruments is explained and demonstrated.	• Explain and demonstrate how to use and check setting out instruments for accuracy.
• Care of setting out instruments is explained and demonstrated	• Explain and demonstrate the care of setting out instruments.
• The concept “error of parallax” is explained with examples of when this error might occur.	• Explain the concept “error of parallax” and give examples of when this error might occur.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations	

SUBJECT OUTCOME	
2.4 Set out shapes	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Right angles are set out using Pythagoras' theorem and the 3-4-5 method.	• Set out right angles using Pythagoras' theorem and the 3-4-5 method.
• The limitations of using the 3-4-5 method to set out shapes are explained.	• Describe the limitations of using the 3-4-5 method to set out shapes.
• Diagonal lengths are measured and compared to confirm squareness of a rectangular set-out.	• Measure and compare diagonal lengths to confirm squareness of a rectangular set-out.
• A right angled corner is set out using a level with a graduated horizontal circle and a plumb bob.	• Set out a right angled corner using a level with a graduated horizontal circle and a plumb bob.
• A right angled corner is set out using an optical square and a plumb bob.	• Set out a right angled corner using an optical square and a plumb bob.
• An equilateral triangle is set out using arcs.	• Set out an equilateral triangle using arcs.
• A hexagon is set out using arcs.	• Set out a hexagon using arcs.
• The benefits of using a rigid bar as a radius arm when setting out large arcs or arches are described	• Describe the benefits of using a rigid bar as a radius arm when setting out large arcs or arches.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations	

SUBJECT OUTCOME	
2.5 Explain and use different levelling instruments.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• The concepts "levelling" and "benchmark" are explained.	• Explain the concepts "levelling" and "benchmark"
• Use of a line level and fish line to transfer levels and measure height differences is explained and demonstrated.	• Explain and demonstrate how to transfer levels and measure height differences with a line level and fish line.
• Use of a water level to transfer levels and measure height differences is explained and demonstrated.	• Explain and demonstrate how to transfer levels and measure height differences with a water level.
• Possible deficiencies of the use of a water level for levelling are described.	• Describe possible deficiencies of use of a water level for levelling.
• A tilting level, automatic level and laser level are differentiated.	• Differentiate between a tilting level, automatic level and laser level.
• An instrument is built (using different materials/ equipment) to explain and illustrate the principles of a tilting level. *Range: Using an inexpensive telescopic rifle sight (with stadia hairs), a small spirit level and an adjustable hinged plywood base (spring loaded to eliminate laitance).*	• Build an instrument (using different materials/ equipment) to explain and illustrate the principles of a tilting level.
• The correct positioning of a levelling instrument is explained.	• Explain the correct positioning of a levelling instrument.
• A level is checked for accuracy using the two-peg test and the adjustment of the line of sight for true horizontality is explained.	• Check a level for accuracy using the two-peg test and explain how to adjust the line of sight to be truly horizontal.

• Circumstances when aluminium staffs are unsuitable for levelling are described.	• Describe circumstances when aluminium staffs are unsuitable to use for levelling.
• Estimation of horizontal distances with a level is explained and demonstrated.	• Explain and demonstrate how to estimate horizontal distances with a level.
• Different chainman commands are used and interpreted *Range: Move top of staff in direction shown, reading taken and recorded, drive peg in at least 25mm, tap peg in 3-5mm (pinch), move pointer in direction indicated, pointer on line: mark or tap in nail.*	• Use and interpret different chainman commands.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Case studies • Practical exercises • Demonstrations	

SUBJECT OUTCOME	
2.6 Set up and use theodolites	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• A theodolite is correctly set up over a peg using an optical plummet.	• Correctly set up a theodolite over a peg using an optical plummet.
• An optical theodolite is used to set out and measure vertical and horizontal angles (in degrees and minutes).	• Use an optical theodolite to set out and measure (in degrees and minutes) vertical and horizontal angles.
• A theodolite is used to plumb columns and measure elevations.	• Use a theodolite to plumb columns and measure elevations.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Case studies • Practical exercises • Demonstrations covering theodolites.	

SUBJECT OUTCOME	
2.7 Set out strip footing foundations for a residential house	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• The foundations of a house are set out in accordance with the prescribed minimum national standards, using batter boards and fish line.	• Set out the foundations of a house according to the minimum prescribed national standards, using batter boards and fish line.
• Square corners are ensured by measuring and comparing diagonals.	• Measuring and comparing diagonals to ensure square corners.
• The trenches are dug and steel pegs driven into the bottom with the aid of a tilting level as a reference for the cast concrete level *Range: the tolerance of the cast concrete level should be +/- 10mm*	• Dig the trenches and drive steel pegs into the bottom with the aid of a tilting level as a reference for the cast concrete level.

ASSESSMENT TASKS OR ACTIVITIES
• Observation • Assignments or tasks • Projects • Case studies • Practical exercises • Demonstrations

Topic 3: Foundations

SUBJECT OUTCOME	
3.1 Explain the principles of founding structures.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• The functions of a foundation are explained.	• Explain the functions of a foundation.
• The working principles for different types of foundation are explained *Range: strip footings, pad foundations, raft foundations, piled foundations and buoyed up foundations).*	• Explain the working principles for different types of foundation.
• The minimum requirements according to prescribed national standards for a strip footing foundation of a single storey residential house are listed.	• List the minimum requirements according to prescribed national standards for a strip footing foundation of a single storey residential house.
• The implications of an inadequate foundation or a foundation not suited to the soil conditions are explained.	• Explain the implications of an inadequate foundation or a foundation that is not suited to the soil conditions.
• The dangers of founding a structure on unconsolidated/ uncompacted fill are described.	• Describe the dangers of founding a structure on unconsolidated/ uncompacted fill.
• The importance of doing a site soil classification/ geo-technical investigation before building a house is explained.	• Explain the importance of doing a site soil classification/ geo-technical investigation before building a house.
ASSESSMENT TASKS OR ACTIVITIES	
• Assignments or tasks • Projects • Case studies • Practical exercises • Demonstrations	

Topic 4: Behaviour of structures

SUBJECT OUTCOME	
4.1 Explain the principles of engineering structures *Range: with reference to simple working models and without mathematical explanations.*	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Define and differentiate different concepts used in engineering structures. *Range: force, load, stress, strength and strain*	• Define and differentiate different concepts used in engineering structures.
• The consequence of subjecting a material to a stress that exceeds its strength is explained.	• Explain what happens when a material is subjected to a stress that exceeds its strength.
• The difference between tension and compression and which would best be carried by a strut and a tie are explained and demonstrated.	• Explain and demonstrate the difference between tension and compression and indicate which would best be carried by a strut and a tie.
• The difference between a “point load” and a “uniformly distributed load” is explained with examples of each.	• Differentiate between a “point load” and a “uniformly distributed load” with examples of each.

• Drawings of simply supported beams and cantilevers are used to sketch how the structure will deform under load, and the parts that stretch (tension) and the parts which are compressed are identified.	• Use drawings of simply supported beams and cantilevers to sketch how the structure will deform under load and identify those parts that stretch (tension) and those parts which are compressed.
• The concept “Neutral Axis” (NA) is explained and sketches provided indicating where it would be expected to be found in tubes, I-beams, angle iron sections and rectangular beams.	• Explain the concept “Neutral Axis” (NA) and sketch where to expect to find it in tubes, I-beams, angle iron sections and rectangular beams.
• The relationship between a simply supported wooden beam’s ability to carry a point load and its span, its depth and its width is explained.	• Explain the relationship between a simply supported wooden beam’s ability to carry a point load and its span, its depth and its width.
• The equilibrium between the compressive resisting forces and tension resisting forces in a simple beam is explained.	• Explain how compressive resisting forces and tension resisting forces in a simple beam remain in equilibrium.
• The principles and uses of arches are explained with a diagram.	• Explain with a diagram the principles and uses of arches.
• “Springing points” in an arch structure in flat and high arches are explained.	• Explain “springing points” in an arch structure in flat and high arches.
• Two different failure mechanisms for true arches subjected to point loads are sketched *Range: a four hinge failure for an eccentric point load and a five hinge failure for a centrally applied point load.*	• Sketch two different failure mechanisms for true arches subjected to point loads.
• The concept ”buckling” and the factors influencing it are explained *Range: slenderness ratio, effective length of the strut, radius of gyration, eccentricity of loading and straightness of the strut*	• Explain the concept “buckling” and the factors that affect buckling.
• An explanation is provided how the effective length of a steel column could be reduced.	• Explain how the effective length of a steel column could be reduced.
• The concept “pin-jointed frame structure” is explained.	• Explain the concept “pin-jointed frame structure”.
• The concept of bracing “rectangular pin-jointed frames” is explained.	• Explain why ”rectangular pin-jointed frames” need triangular bracing to stabilise them.
• The stabilising and maintenance of shape of rectangular pin-jointed frames is explained.	• Describe how to stabilise and maintain the shape of rectangular pin-jointed frames.
• A given sketch is analysed and a range of different structural components indicated. *Range: load application point/s and the supports, a prediction of how the structure will deflect, identify members in tension and compression, redundant components that could be taken out without affecting the stability of the structure under design loading*	• Analyse a given sketch and indicate a range of different structural components.
• A degree of redundancy is explained as a safe insurance policy in the real world.	• Explain a degree of redundancy as a safe insurance policy in the real world.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Case studies • Practical exercises • Demonstrations	

Topic 5: International System (SI) units of measurement

SUBJECT OUTCOME	
5.1 Understand and use SI units of measurement *Range: NIST Publication 811 (SP 811) Guide for the use of the International System of units (SA).*	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Basic units of measurement used in engineering structures and construction planning are defined. *Range: length, mass, time, electric current, thermodynamic temperature.*	• Define basic units of measurement used in engineering structures and construction planning.
• International system (SI) derived units are defined. *Range: area, volume, velocity, acceleration, density*	• Define international system (SI) derived units.
• International system (SI) derived units with special names and symbols are defined. *Range: such as force, pressure or stress, energy or work done and power.*	• Define international system (SI) derived units with special names and symbols.
• International system (SI) prefixes are converted into numbers. *Range: deci, centi, milli, micro, deca, hecto, kilo, mega and giga.*	• Convert international system (SI) prefixes into numbers.
• International system (SI) units are converted between different prefixes *Range: convert newtons per m^2 into kPa*	• Convert international system (SI) units between different prefixes.
ASSESSMENT TASKS OR ACTIVITIES	
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations	

Topic 6: Areas and Volumes

SUBJECT OUTCOME	
6.1. Calculate areas and volumes	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Volumes of concrete needed to build strip footing foundations and surface beds are calculated.	• Calculate volumes of concrete needed to build strip footing foundations and surface beds.
• The volume of plaster required - excluding waste - to plaster walls with an average finished plaster thickness of 15mm is calculated.	• Calculate the volume of plaster required - excluding waste - to plaster walls with an average finished plaster thickness of 15mm.
• The volume of a conical pile of sand where the height and diameter of the pile are known is calculated.	• Calculate the volume of a conical pile of sand where the height and diameter of the pile are known.
• The volume of paint required to coat a structure is calculated given the application rate of the paint.	• Calculate the volume of paint required to coat a structure given the application rate of the paint.
• The area per unit and the number of units per square metre in a wall is calculated given the dimensions of a unit and the thickness of mortar bed joints. *Range: the blocks or bricks including the mortar attached to each unit*	• Calculate the area per unit and the number of units per square metre in a wall given the dimensions of a unit and the thickness of mortar bed joints.

ASSESSMENT TASKS OR ACTIVITIES
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations

Topic 7: Technical drawing

SUBJECT OUTCOME	
7.1. Read and interpret information conveyed by technical drawings.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Different technical drawings are explained. *Range: plans, elevations and sections*	• Different technical drawings are explained.
• The importance of inspecting new drawings is explained *Range: specific job, most recent version, related documentation is attached.*	• Explain the importance of inspecting new drawings and attached documents before commencing with activities.
• The procedures to follow when drawings are revised are described. *Range: Marking and filing obsolete drawings*	• Describe the procedures to follow when drawings are revised.
• All symbols used on drawings are identified *Range: North point, trees, railway lines*	• Identify all symbols used on drawings.
• The orientation of a drawing on a construction site is demonstrated using the North compass direction indicator and adjacent landmarks.	• Demonstrate how to orientate a drawing on a construction site using the North compass direction indicator and adjacent landmarks.
• The meanings of different lines used on drawings are explained *Range: bold continuous, solid continuous, cutting and viewing plane, dotted, chain dotted and break lines*	• Explain the meaning of different lines used on drawings.
• The uses of hatching are explained. *Range: denote a slice or section through an object , define different types of brickwork*	• Explain the uses of hatching.
• The importance of using actual dimensions rather than scale dimensions off a drawing is explained.	• Explain the importance of using actual dimensions rather than scale dimensions off a drawing.
• The procedures to follow when ambiguities/ contradictions are encountered in drawings and/ or specifications are described.	• Describe the procedures to follow when ambiguities/ contradictions are encountered in drawings and/ or specifications.
• Missing dimensions on drawings are calculated.	• Calculate missing dimensions on drawings.
• Abbreviations commonly found on construction drawings are interpreted.	• Interpret abbreviations commonly found on construction drawings.
• Different construction materials are identified by the colour code according to prescribed national standards.	• Identify different construction materials by the colour code according to prescribed national standards.
• Different materials are identified by hatching conventions used *Range: timber end grain, timber long grain, concrete, earth, glass, sand and plaster).*	• Identify different materials by hatching conventions used.
• Dimensions are estimated from scale drawings using a scale ruler and an ordinary ruler.	• Estimate dimensions from scale drawings using a scale ruler and an ordinary ruler.

ASSESSMENT TASKS OR ACTIVITIES
• Observation • Assignments or tasks • Projects • Practical exercises • Demonstrations

4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN CONSTRUCTION PLANNING – LEVEL 2

4.1 Integrated summative assessment task (ISAT)

A compulsory component of the external assessment (ESASS) is the **integrated summative assessment task (ISAT)**, which is a major assessment task that 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 ISAT may be as follows:

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

OR

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

The 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.

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 is suggested:

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