



**education**

Department:  
Education  
REPUBLIC OF SOUTH AFRICA

# **NATIONAL CERTIFICATES (VOCATIONAL)**

## **SUBJECT GUIDELINES**

### **DRAWINGS AND SETTING OUT, QUANTITIES AND COSTING**

**NQF LEVEL 2**

September 2007



## INTRODUCTION

### **A. What is Drawings and Setting out, Quantities and Costing?**

Drawings and Setting out, Quantities and Costing focuses on the construction and building environment and deals with the reading and interpretation of drawings and the production of freehand drawings. Students learn to identify symbols and specifications in drawings to determine information for Setting out and identifying material types to use in construction projects. Students also calculate quantities and perform costing.

### **B. Why is Drawings and Setting out, Quantities and Costing important in the Building and Civil Construction programme?**

The ability to read and interpret drawings and produce freehand drawings serves as a form of communication within construction and building environments. Drawings and Setting out, Quantities and Costing also enables students to describe and use instruments for Setting out and levelling correctly.

### **C. The link between Drawings and Setting out, Quantities and Costing Learning Outcomes and the Critical and Developmental Outcomes**

Students will be able to identify different types of tools to perform Setting out and levelling activities. They will work effectively with the team in activities such as describing construction contracting procedures and processes. Students will also learn the proper way of communicating activities in construction contracting.

### **D. Factors that contribute to achieving the Drawings and Setting out, Quantities and Costing Learning Outcomes**

- Thorough preparation for teaching and learning activities
- An environment conducive to teaching and learning through effective learner support, motivation, commitment, a positive attitude and interest in the subject
- Student exposure to the construction environment

# **DRAWINGS AND SETTING OUT, QUANTITIES AND COSTING – LEVEL 2**

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## 1 DURATION AND TUITION TIME

This is a one-year instructional programme comprising 200 teaching and learning hours. The subject may be offered on a part-time basis provided the student meets all the assessment requirements.

Students with special education needs (LSEN) must be catered for in a way that eliminates barriers to learning.

## 2 SUBJECT LEVEL FOCUS

The student will be able to:

- Read, interpret and use simple construction drawings and specifications.
- Produce freehand drawings and use basic drawing skills.
- Measure quantities using the appropriate instruments.
- Perform activities using levelling, measuring and setting out instruments and accessories.
- Use and maintain a dumpy level.

## 3 ASSESSMENT REQUIREMENTS

### 3.1 Internal assessment (50 percent)

#### 3.1.1 Theoretical component

The theoretical component forms 40 percent of the internal assessment mark.

Internal assessment of the theoretical component in Drawings and Setting out, Quantities and Costing Level 2 takes the form of observation, class questions, group work, informal group competitions with rewards, individual discussions with students, class, topic and semester tests and internal examinations. Lecturers can observe students when marking exercises from the previous day and asking class questions.

Assignments, case studies and tests can be completed at the end of a topic. Tests and internal examinations must form part of the internal assessment.

#### 3.1.2 Practical component

The practical component forms 60 percent of the internal assessment mark.

Practical components include applications and exercises. All practical components must be indicated in a Portfolio of Evidence (PoE).

Internal assessment of the practical component in Drawings and Setting out, Quantities and Costing Level 2 takes the form of assignments, practical exercises, case studies and practical examinations in a simulated building environment.

Students may complete practical exercises daily. Assignments and case studies can be completed at the end of a topic. Practical examinations can form part of internal practical assessment.

- **Some examples of practical assessments include, but are not limited to:**

- A. Presentations (lectures, demonstrations, group discussions and activities, practical work, observation, role-play, independent activity, synthesis and evaluation)
- B. Exhibitions by students
- C. Visits undertaken by students based on a structured assignment task
- D. Research
- E. Task performance in a “Structured Environment”

- **Definition of the term “Structured Environment”**

For the purposes of assessment, “Structured Environment” refers to a simulated workplace or workshop environment. Activities in the simulated workplace or environment must be documented in a logbook with a clear listing of the competencies to be assessed. The following information must be contained in the logbook:

- Nature of department or environment in which practical component was achieved
- Learning Outcomes
- Activities in the environment with which to achieve the Learning Outcomes
- Time spent on activities
- Signature of lecturer or supervisor and student

For the logbook to be regarded as valid evidence, it must be signed by an officially assigned supervisor.

#### • Evidence in practical assessments

All evidence pertaining to evaluation of practical work must be reflected in the students' Portfolio of Evidence (PoE). The tools and instruments constructed and used to conduct these assessments must be clear from the evidence contained in the Portfolio of Evidence (PoE).

#### 3.1.3 Processing of internal assessment mark for the year

A year mark out of 100 is calculated by adding the marks of the theoretical component (40 percent) and the practical component (60 percent) of the internal continuous assessment (ICASS).

#### 3.1.4 Moderation of internal assessment mark

Internal assessment is subjected to internal and external moderation procedures as set out in the *National Examinations Policy for FET College Programmes*.

### 3.2 External assessment (50 percent)

A National Examination is conducted annually in October or November by means of a paper(s) set and moderated externally. A practical component will also be assessed.

External assessment details and procedures are set out in the *Assessment Guidelines: Drawings and Setting out, Quantities and Costing (Level 2)*.

## 4 WEIGHTED VALUES OF TOPICS

| TOPICS  | WEIGHTED VALUE |
|---|----------------|
| 1. Simple Construction Drawings and Specifications                  | 20             |
| 2. Freehand Drawings and Basic Drawing Skills                       | 10             |
| 3. Measurement of Quantities  | 20             |
| 4. Levelling, Measuring and Setting out Instruments and Accessories | 20             |
| 5. Dumpy Level  | 5              |
| 6. Introduction to Quantity Surveying Concepts                      | 5              |
| 7. Calculation of Quantities and Cost                               | 20             |
| <b>TOTAL</b>  | <b>100</b>     |

## 5 CALCULATION OF FINAL MARK

Internal assessment mark: Student's mark/100 x 50 = a mark out of 50 (a)

Examination mark: Student's mark/100 x 50 = a mark out of 50 (b)

**Final mark: (a) + (b) = a mark out of 100**

All marks are systematically processed and accurately recorded to be available as hard copy evidence for, amongst others, reporting, moderation and verification purposes.

## 6 PASS REQUIREMENTS

The student must obtain at least fifty (50) percent in ICASS and fifty (50) percent in the examination.

## 7 SUBJECT AND LEARNING OUTCOMES

On the completion of Drawings and Setting out, Quantities and Costing Level 2, the learner should have covered the following topics:

- Topic 1: Simple Construction Drawings and Specifications
- Topic 2: Freehand Drawings and Basic Drawing Skills
- Topic 3: Measurement of Quantities
- Topic 4: Levelling, Measuring and Setting out Instruments and Accessories
- Topic 5: Dumpy Level
- Topic 6: Introduction to Quantity Surveying Concepts
- Topic 7: Calculation of Quantities and Cost

### 7.1 Topic 1: Simple Construction Drawings and Specifications

**Subject Outcome 1:** Explain the role of drawings and specifications.

**Learning Outcomes:**

The student should be able to:

- Explain the role of drawings in relation to project specifications, contract documents and quantities and construction.
- Explain the role of specifications in relation to quantity of materials, quality of the work, contract documents and payment to contractors.

**Subject Outcome 2:** Identify and interpret drawings and symbols used on construction drawings.

**Learning Outcomes:**

The student should be able to:

- Identify drawings in terms of type and application for a construction process.
- Explain key functions of drawing in terms of the finished product.
- Identify the key users of drawing in terms of work responsibilities.
- Explain specifications and notes in terms of work requirements.
- Interpret symbols and abbreviations in terms of functions and meanings.
- Interpret the layout in terms of the different elevations shown.
- Explain the purpose of each view in terms of the results of the product.

**Subject Outcome 3:** Store drawings in a secure place in accordance with company procedures.

**Learning Outcomes:**

The student should be able to:

- Explain the purpose of drawing and revision numbers to ensure that the correct drawing is used.
- Explain the hazardous results and consequences for the finished product of using wrong drawings.
- Store drawings in a secure place according to company procedures.

**Subject Outcome 4:** Apply information from drawings to construction activities.

**Learning Outcome:**

The student should be able to:

- Extract information from drawings and determine Setting out requirements on site.

### 7.2 Topic 2: Freehand Drawings and Basic Drawing Skills

**Subject Outcome 1:** Discuss and explain freehand drawing concepts.

**Learning Outcomes:**

The student should be able to:

- Use examples of drawings to discuss and explain depth, dimension and proportion.
- Use examples of drawings to discuss and explain projections, elevations and shapes.

*Range: First and third-angle projections, isometric and oblique elevations, construction of geometrical shapes and single-plane sectional elevations*

**Subject Outcome 2:** Interpret freehand drawings.

**Learning Outcomes:**

The student should be able to:

- Identify and interpret component requirements.
- Read and interpret the dimensions, instructions, symbols and conventions of freehand drawings.

*Range: First and third-angle orthographic projection and isometric and oblique elevations, including hidden detail and single-plane sectional elevations*

**Subject Outcome 3:** Produce basic freehand drawings.

**Learning Outcomes:**

The student should be able to:

- Prepare a layout for a drawing.
- Interpret the brief correctly.
- Produce freehand drawings.

*Range: First and third-angle orthographic projections and isometric and oblique elevations*

### 7.3 Topic 3: Measurement of Quantities

**Subject Outcome 1:** Use measurement units and symbols in calculations.

**Learning Outcomes:**

The student should be able to:

- Perform calculations of basic units such as length, area, volume, mass, weight and force and explain various concepts.
- Convert basic units.

### 7.4 Topic 4: Levelling, Measuring and Setting out Instruments and Accessories

**Subject Outcome 1:** Describe the use and adjustment of levelling, measuring and Setting out instruments.

**Learning Outcomes:**

The student should be able to:

- List and describe different levelling instruments.  
*Range: spirit level, water level, dumpy level*
- Explain the operating systems of the different types of levelling instruments.
- Describe the advantages of using levelling instruments in construction.
- List and describe different instruments used in measuring and Setting out.

*Range: Tapes, verniers, micrometers*

- Explain the use and maintenance of instruments used for levelling, Setting out and measuring.

**Subject Outcome 2:** Use various instruments correctly for measuring, Setting out and levelling.

**Learning Outcomes:**

The student should be able to:

- Select and prepare the correct instruments for Setting out.
- Prepare the site and set out the foundations.
- Maintain various Setting out instruments.
- Select and prepare correct instruments for levelling.
- Execute the levelling of structures.
- Maintain levelling instruments.

### 7.5 Topic 5: Dumpy Level

**Subject Outcome 1:** Explain and describe the use and adjustment of the dumpy level.

**Learning Outcomes:**

The student should be able to:

- Describe and explain the use and application of a dumpy level.
- Explain the setting and adjustment of the dumpy level.



**Subject Outcome 2:** Demonstrate the ability to use the dumpy level.

**Learning Outcome:**

The student should be able to:

- Use a dumpy level correctly according to prescriptions.

### 7.6 Topic 6: Introduction to Quantity Surveying Concepts

**Subject Outcome 1:** Explain and define various terms in quantity surveying.

**Learning Outcome:**

The student should be able to:

- Explain quantity surveying terms in relation to different processes of quantity surveying.

*Range: Taking off method, abstracting and building*

### 7.7 Topic 7: Calculate quantities and costs based on drawings and plans.

**Subject Outcome 1:** Explain and describe the use and adjustment of the dumpy level.

**Learning Outcomes:**

The student should be able to:

- Calculate work areas according to the building plan.
- List materials required according to specifications.
- Calculate specific quantities of the different materials needed.
- Investigate prices for the materials.
- Calculate costs of material as specified in the building plan.

## 7 RESOURCE NEEDS FOR THE TEACHING OF DRAWINGS AND SETTING OUT, QUANTITIES AND COSTING – LEVEL 2

### 8.1 Physical resources

- Suitable venue for experiments
- Teaching aids and pre-designed models
- Work tables and chairs
- Chalkboards
- Dumpy level and measuring tapes
- Overhead projector

### 8.2 Human resources

The lecturer should have an acceptable NQF level qualification and should preferably be a registered assessor. The lecturer should be committed to continually improving and expanding his or her knowledge and skills.

### 8.3 Other resources

- Budget according to building requirements