



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

SUBJECT GUIDELINES

DRAWINGS, SETTING OUT, QUANTITIES AND COSTING NQF Level 4

September 2007

DRAWINGS, SETTING OUT, QUANTITIES AND COSTING – LEVEL 4

CONTENTS

INTRODUCTION

1 DURATION AND TUITION TIME

2 SUBJECT LEVEL FOCUS

3 ASSESSMENT REQUIREMENTS

3.1 Internal assessment

3.2 External assessment

4 WEIGHTED VALUES OF THE TOPICS

5 CALCULATION OF FINAL MARK

6 PASS REQUIREMENTS

7 SUBJECT AND LEARNING OUTCOMES

7.1 Read interpret and produce specialised construction drawings

7.2 Identify, interpret and produce working reinforced concrete detail drawings

7.3 Develop and produce computer aided drawings

8 RESOURCE NEEDS FOR THE TEACHING OF DRAWING, SETTING OUT, QUANTITIES AND COSTING - LEVEL 4

8.1 Human Resources

8.2 Physical Resources

8.3 Teaching and learning resources

8.4 Other resources

INTRODUCTION

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

Drawings, 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, 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, Setting Out, Quantities and Costing also enables students to describe and use instruments for setting out and levelling correctly.

C. The link between the Learning Outcomes for Drawings, Setting Out, Quantities and Costing 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, Setting Out, Quantities and Costing Learning 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.

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

1 DURATION AND TUITION TIME

This is a one year instruction programme comprising of 200 teaching and learning hours. The subject may be offered on a part-time basis provided all assessment requirements set out hereunder are adhered to.

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

2 SUBJECT LEVEL FOCUS

- Read, interpret and produce advanced construction drawings
- Identify, interpret and produce working reinforced detail drawings
- Develop and produce computer aided drawings

3 ASSESSMENT REQUIREMENTS

3.1 Internal assessment (50 percent)

All internal assessments refer to continuous assessment, which is college-based assessment. The achievement of Learning Outcomes contributes towards the achievement of the qualification.

3.1.1 Theoretical Component

The theoretical component will form 40 percent of the internal assessment, based on the fact that the subject requires a broad theoretical knowledge base. Evidence of theoretical assessment must reflect in the Portfolio of Evidence (PoE).

3.1.2 Practical Component

The practical component will form 60 percent of internal assessment. All students must have a PoE for the purpose of assessment.

- **Some examples of practical assessments include, but are not limited to:**
 - Presentations (lectures, demonstrations, group discussions and activities, practical work, observation, role play, self activity, judging and evaluation)
 - Use of aids
 - Exhibitions
 - Visits
 - Guest speaker presentations
 - Research

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

“Structured environment” for the purposes of assessment refers to an actual or simulated workplace, or workshop environment.

Evidence of the practical component must be provided in the form of a logbook with a clear listing of the competencies to be assessed. The following information must be contained in the logbook:

- Date
- Task
- Summary of Task
- Supervisor’s signature
- Student’s signature
- Date of completion of task

For the logbook to be regarded as valid evidence it must be reflected in the student’s PoE. An officially assigned supervisor must sign this off.

• Evidence in practical assessments

All evidence pertaining to evaluation of practical work must be reflected in the student's PoE. The assessment instruments used for the purpose of conducting such assessments must be part of the evidence contained in the 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 and the practical component of the internal continuous assessment.

3.1.4 Moderation of internal assessment mark

Internal assessment is subject to internal and external moderation procedures as set out in the *National Examinations Policy for Further Education and Training College Programmes*.

3.2 External assessment (50 percent)

A national examination is conducted annually in October or November by means of a paper set externally and marked and moderated internally. External assessment details are set out in the *Assessment Guidelines: Drawings, Setting Out, Quantities and Costing* (Level 4).

4 WEIGHTED VALUES OF THE TOPICS

TOPICS	WEIGHTED VALUE
1. Read, interpret and produce specialised construction drawings	40%
2. Identify, interpret and produce working reinforced concrete detail drawings	20%
3. Develop and produce computer aided drawings	40%
TOTAL	100

5 CALCULATION OF FINAL MARK

Continuous Assessment: Student's mark/100 x 50/1 = a mark out of 50 (a)

Theoretical Examination Mark: Student's mark/100 x 50/1 = 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, purposes of moderation and verification.

6 PASS REQUIREMENTS

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

7 SUBJECT AND LEARNING OUTCOMES

On completion of Drawings, Setting Out, Quantities and Costing Level 4 the student should have covered the following topics:

- Topic 1: Read, interpret and produce specialised construction drawings
- Topic 2: Identify, interpret and produce working reinforced concrete detail drawings
- Topic 3: Develop and produce computer aided drawings

7.1 Topic 1: Read interpret and produce specialised construction drawings

7.1.1 Subject Outcome: Read drawings and symbols used in working civil construction drawings.

Learning Outcomes:

- Interpret symbols, dimensions and abbreviations in terms of their functions and meanings.
- Explain specifications and notes in terms of work requirements.
- Interpret and explain material lists and schedules.
- Identify and interpret specialized drawings.
Range: Theory is interpreted through 2D drawings.

7.1.2 Subject Outcome 2: Interpret drawings for waterproofing.

Learning Outcomes:

- Complete detail on drawings according to specified requirements.
- Draw sectional views through the walls of basement.
- Draw a basement with brick and mortar to show reinforcement and waterproofing.
Range: Terms include reinforcement, co-ordinates, levels, compressive and tensile strengths. Waterproofing includes waterproofing materials and techniques.
- Basement includes reinforced strip foundations or raft foundations.

7.1.3 Subject Outcome 3: Use drawings to interpret the structure of a building.

Learning Outcomes:

- Draw multi level floor layouts showing beam positioning.
- Identify column positioning on multi level buildings.
- Draw retaining wall showing the foundation, reinforcement and level differential.
- Identify and explain reinforcement in tension and compression.
- Explain causes for cracking in concrete.
- Describe the different grades for reinforcement steel.
- Read and explain the compressive strength of concrete at a specified period.

7.1.4 Subject Outcome 4: Produce civil construction drawings.

Learning Outcomes:

- Draw floor layouts for multi level buildings according to specified requirements.
- Draw sectional views of multi level buildings and retaining walls in accordance with relevant code of practice.
- Produce 2D drawings for civil construction.
Range: Floor plan, elevations, cross sectional views, site plan.

7.2 Topic 2: Identify, interpret and produce working reinforced concrete detail drawings

7.2.1 Subject Outcome 1: Identify and explain reinforced concrete detailing.

Learning Outcomes:

- Explain reinforced concrete terms in terms of relevant code of practice.
- Draw different beam, slab and column configuration.
- Explain different grades of steel used for reinforcing.
- Explain reinforcement in tension and compression to prevent cracking of concrete.

7.2.2 Subject Outcome 2: Show and detail beams, foundations and pile caps according to specified requirement.

Learning Outcomes:

- Complete a floor layout from a given diagram.
- Detail beams and foundations and show longitudinal and end sections.
- Detail pile caps and show side sections.
- Mark reinforcing on detail drawings with respect to beams.

7.2.3 Subject Outcome 3: Produce detailed drawings for reinforced staircases.

Learning Outcomes:

- Draw floor layouts for single flight staircases.
- Draw detailed drawings for single flight staircases.
- Mark reinforcing on detailed drawings with respect to single flight staircases.

7.3 Topic 3: Develop and produce computer aided drawings

7.3.1 Subject Outcome 1: Explain drawing terminology, procedures and processes using computer aided programmes.

Learning Outcomes:

- Describe an appropriate computer hardware and software product available for drawings.
- Explain drawing office procedures and processes.
- Explain in detail computer aided drawing commands.

7.3.2 Subject Outcome 2: Demonstrate the technical ability to use a computer.

Learning Outcome:

- Demonstrate basic computer literacy by using appropriate computer hardware and software correctly.

7.3.3 Subject Outcome 3: Produce computer aided drawing to line stage.

Learning Outcomes:

- Use and apply an appropriate computer-aided design programme and its commands to perform drawing operations.
- Draw elevations and parameters to scale and positioned to suit design.
- Project views according to the requirements of the brief.
- Construct relevant dimensions and assemblies in accordance with final design requirements.
- Ensure constructed drawing conforms to selected views and layout.
- Ensure drawings comply with codes of practice for construction drawings.
- Cross-reference multiple sheet drawing layouts according to organisational requirements.
- Select the data title block, layout, number type of views and reference data to suit the task.

7.3.4 Subject Outcome 4: Detail computer aided drawing.

Learning Outcomes:

- Identify, produce and position logos and symbols to comply with requirements.
- Add drawing notes and presentation detail where required by the task to comply with requirements and code of practice.
- Save drawings to file according to organisational procedures.

7.3.5 Subject Outcome 5: Verify detailed drawing.

Learning Outcomes:

- Print a draft copy and check against brief to ensure compliance and modifications are identified and authorised.
- Modify drawings where necessary to ensure completeness and compliance.
- Verify drawings to meet job requirements.

7.3.6 Subject Outcome 6: Produce hard copy of a final drawing.

Learning Outcomes:

- Select the paper size, orientation scale and format to ensure compliance with standards.
- Print final copy that meets brief and requirements within an agreed time frame.
- Carry out final administrative and office procedures according to organisational requirements.

8 RESOURCE NEEDS FOR THE TEACHING OF DRAWING, SETTING OUT, QUANTITIES AND COSTING - LEVEL 4

8.1 Human Resources

Minimum educator qualifications: an acceptable NQF level qualification, registered assessor and on-going top-up training and upskilling requirements.

8.2 Physical Resources

Suitable venue to conduct computer classes, teaching aids and pre-designed models, work tables, chairs, chalkboards.

8.3 Teaching and learning resources

Overhead projector, chalkboard, pre-designed models tools/equipment requirements, teaching and learning materials/resources.

8.4 Other resources

- Electronic distant measuring devices
- Measuring tape
- Theodolite
- Drawing paper