NATIONAL CERTIFICATE (VOCATIONAL)

SUBJECT GUIDELINES

CONSTRUCTION PLUMBING
NQF Level 3

September 2007
CONSTRUCTION PLUMBING – LEVEL 3

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 Plan and prepare to perform plumbing works
   7.2 Repairs to waste, soil and drain pipes
   7.3 Install geysers
   7.4 Install rainwater goods and flashings
   7.5 Apply basic business principles
8 RESOURCE NEEDS FOR THE TEACHING OF CONSTRUCTION PLUMBING LEVEL 3
   8.1 Physical resources
   8.2 Human resources
   8.3 Teaching and learning resources
   8.4 Other Resources
INTRODUCTION

A. What is Construction Plumbing?
In Construction Plumbing, students acquire the skills to install sanitary fittings, water piping to buildings and sewerage systems.

B. Why is Construction Plumbing important in the Building and Civil Construction programme?
Most building structures require plumbing; therefore, students interested in careers in the building and civil construction industry must be aware of plumbing principles and requirements.

C. The link between Construction Plumbing Learning Outcomes and the Critical and Developmental Outcomes
In Construction Plumbing, students develop the skill to work in a team and to identify and provide possible causes of and solutions to problems. Students also learn to understand and contribute to the environment by meaningfully interpreting information which they will come across in their future lives.

Students can demonstrate an understanding of the world as a set of related systems by recognising the impact that the different construction environments can have on an industry. Lastly, students can explore educational and career opportunities in the industry and important building services.

D. Factors that contribute to achieving the Construction Plumbing Learning Outcomes
- Thorough preparation for teaching and learning activities
- An environment conducive to teaching and learning through effective student support, motivation, commitment and a positive attitude
- An interest in Construction Plumbing
- Exposure to construction environments
1 DURATION AND TUITION TIME
This is a one year learning programme comprising 200 teaching and learning hours and carries 20 credits. 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 any barriers to learning.

2 SUBJECT LEVEL FOCUS
- Plan and prepare to perform plumbing works.
- Repairs to waste, soil and drain pipes.
- Installing geysers
- Installing rainwater goods and flashings
- Basic business concepts

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. All internal assessments must be finalised by an assessor who has been declared competent by an accredited provider.

3.1.1 Theoretical Component
The theoretical component will form 60 percent of the internal assessment, since the subject requires a broad theoretical knowledge base. Evidence of theoretical assessment must also be reflected in the Portfolio of Evidence (PoE).

3.1.2 Practical Component
The practical component will form 40 percent of internal assessment. All students must have a PoE with evidence of all practical work produced by the student.

- 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
  - Structured environment

- 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 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. The tools and instruments constructed and used for the purpose of conducting such assessment must be clear from evidence contained in the 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 students’ PoE. The tools and instruments constructed and used for the purpose of conducting such assessments must be clear from 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 (60 percent indicated above) and the practical component (40 percent indicated above) of the internal continuous assessment.

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 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: Construction Plumbing (Level 3).

4 **WEIGHTED VALUES OF THE TOPICS**

<table>
<thead>
<tr>
<th>TOPICS</th>
<th>WEIGHTED VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Plan and prepare to perform plumbing works</td>
<td>10%</td>
</tr>
<tr>
<td>2. Repairs to waste, soil and drain pipes.</td>
<td>10%</td>
</tr>
<tr>
<td>3. Install geysers</td>
<td>25%</td>
</tr>
<tr>
<td>4. Install rainwater goods and flashings</td>
<td>35%</td>
</tr>
<tr>
<td>5. Apply basic business principles</td>
<td>20%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

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**

A student must obtain at least fifty (50) percent in ICASS and fifty (50) percent in the examination.
### SUBJECT AND LEARNING OUTCOMES

On completion of Construction Plumbing Level 3 the student should have covered the following topics:

- **Topic 1**: Plan and prepare to perform plumbing works
- **Topic 2**: Repairs to waste, soil and drain pipes
- **Topic 3**: Install geysers
- **Topic 4**: Install rainwater goods and flashings
- **Topic 5**: Apply basic business principles

#### 7.1 Topic 1: Plan and prepare to perform plumbing works

**7.1.1 Subject Outcome:** Set out work for plumbing.

**Learning Outcome:**
- Identify the correct work area according to the drawings.
- Communicate and agree on a work task according to work site procedures.
- Measure and set out the work area according to the drawings and specifications.
- Determine and transfer levels according to work site procedures.

**7.1.2 Subject Outcome:** Procure resources for plumbing.

**Learning Outcome:**
- Procure correct tools and equipment according to site requirements.
- Calculate, order and prepare quantities of materials according to site procedures.
- Recruit labour according to the job requirements.

**7.1.3 Subject Outcome 3:** Prepare work areas for plumbing.

**Learning Outcome**
- Identify and communicate work that affects other contractors or artisans, according to work site procedures.
- Select and use correct materials, tools and equipment according to best site practice.
- Select and prepare safety equipment and clothing according to the Occupational Health and Safety Act and site procedures.
- Identify and protect against damage to existing services and built-in items according to site procedures.

#### 7.2 Topic 2: Repairs to waste, soil and drain pipes

**7.2.1 Subject Outcome 1:** PVC cut out the damaged section of pipe and repair, using a Kimberley socket.

**Learning Outcome:**
- Mark appropriate distance on either side of the damaged pipe to enable the removal of one of the existing pipes.
- Cut out the damaged section of the pipe and chamfer the spigot of remaining pipe as well as the burrs from the inside of the spigot.
- Cut out new pipe and prepare it for joining and fitting, applying appropriate lubricant liberally to both spigot.
- Adjust new pipe and the Kimberley socket so that both entry marks are just visible.

#### 7.3 Topic 3: Install geysers

**7.3.1 Subject Outcome 1** Install a push through geyser in accordance with the drawing.

**Learning Outcome:**
- Position and fit push through geyser in accordance with the drawing.
- Secure geyser plumb to the wall using the brackets supplied.
• Use appropriate jointing material and remove the access material.
• Mount all surface pipe-works 25mm away from and parallel to the wall by secured appropriate holder bats.

7.3.2 Subject Outcome 2: Install a high-pressure geyser, cold water supply and hot water distributing pipes according to the drawing

Learning Outcome:
• Fit high-pressure geyser in the roof space.
• Support the geyser on tie beams.
• Install an overflow pipe from the drip tray so that the overflow water falls and terminates outside the building.
• Install the cold water supply to the geyser, basin, bath and sink.
• Install the hot water distributing pipe fittings with a vacuum breaker to the sink, bath and basin.
• Fit a TP master valve to the top of the geyser and a pressure control valve.
• Fit a stopcock in the correct direction of the flow.

7.4 Topic 4: Install rainwater goods and flashings

7.4.1 Subject Outcome 1: Fit GMS gutters and down pipe in accordance with the drawing.

Learning Outcome:
• Fabricate a stop-end from GMS flat sheet, fitted and soldered.
• Fit appropriate gutter brackets with the front ends bolted through the gutter.
• Fix the gutters with a minimum fall of 5mm overall towards the outlet.
• Cut the hole for the gutter outlet neatly 300mm from the stop-end.
• Solder gutter outlet sound and free of defects and remove the excess flux from the gutter joints.
• Measure, cut, assemble and solder the rainwater offset.
• Measure, cut, assemble and solder the rainwater pipe and shoe sound and free from defects and excess flux.
• Fit the rainwater pipe plumb at the back 25mm away from the wall with holder bats securely tightened and the shoe 150mm above the ground level.

7.4.2 Subject Outcome 2: Mark out, cut fold and fit the bottom half of the cover flashing

Learning Outcome:
• Lay bottom half of cover flashing over the roof covering by a minimum of 180mm with the up-stand a minimum of 50 mm bent to the roof angle. Flashing to extend either side of the chimney by a minimum of 18mm.
• Lay the side cover flashing over the roof by a minimum of 180mm with the up-stand a minimum of 50mm.
• Form and solder the mitre to fit at the corners free of defects.
• Fit the back gutter to continue up the roof by a minimum of 200mm with the up-stand a minimum of 80mm and bent to the roof angle. It has to extend either side of the chimney by a minimum of 180mm.
• Lay the side cover flashing over the roof covering by a minimum of 180mm with the up-stand minimum of 50mm and the side centre laps a minimum of 150mm. All soldering to be sound and free of defects.

7.4.3 Subject Outcome 3: Mark out, cut, fold and fit the front apron flashing.

Learning Outcome:
• Turn the apron-flashing around both sides of the chimney by a minimum of 50mm with the bottom edge finish 10mm above the corner flashing.

7.4.4 Subject Outcome 4: Mark out, cut, fold and fit both sides of the step flashing.

Learning Outcome:
• Turn the first steps around the front of the chimney by a minimum of 75mm with the bottom edges finishing 10mm above the cover flashing. The steps must lap each other by a minimum of 75mm.
• Turn the fourth step around the back of the chimney by a minimum of 75mm with the bottom edges finishing 10mm above the cover flashing. The steps must lap the third steps by a minimum of 75mm.
7.4.5 Subject Outcome 5: Mark out, cut, fold and fit the apron flashing

Learning Outcome:
- Turn the flashing around both sides of the chimney by a minimum of 50mm with the bottom edge finish 10mm above the bottom of the gutter.
- Securely wedge the apron flashing.
- Point all the joints.

7.4.6 Subject Outcome 6: Develop, cut out, fold, assemble, solder and fit GMS vent pipe flashing in accordance with the drawing

Learning Outcome:
- Solder the flashing sound and free of defects with all the excess flux removed.
- Fit the cone of the vent pipe flashing close to the vent pipe.
- Fit the bottom and sides of the flashing neatly onto the roof covering.
- Fit the roof covering neatly over the top of the flashing.
- Stagger the bottom edge of the cone alternately with 10mm laps.

7.5 Topic 5: Apply basic business principles

7.5.1 Subject Outcome 1: Explain how to start up a small business and apply basic business principles.

Learning Outcome:
- Describe how to set up and conduct a small business offering services in accordance with healthy business standards.
- Draw up an elementary business plan to start up a small business.
  Range: Name and logo for business, contact details, services rendered, start-up capital, equipment and tools, price structures, advertising, staff and staff remuneration, competitors, profit and loss.

7.5.2 Subject Outcome 2: Explain record keeping of business activities.

Learning Outcome:
- Describe different methods of payments by customers and related documents to record business transactions.
- Explain correct handling of cash flow.
  Range: Purchases of materials, payment of wages, unforeseen payments and expenses, shortage and surplus of funds.

7.5.3 Subject Outcome 3: Explain procedures of dealing with customers or clients.

Learning Outcome:
- Explain professional dealing with customers and delivering of good customer services.
  Range: contact and communication with customers, planning of work activities, overlap of contracts and services offered, deadlines.
- Explain how to deal with customer complaints.
8 RESOURCE NEEDS FOR THE TEACHING OF CONSTRUCTION PLUMBING LEVEL 3

8.1 Physical resources
A suitable venue for carrying out practicals, teaching aids, worktables, chairs, chalkboards.

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

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

8.4 Other Resources
Build different workbays.
Toolbox and tools for each student.