NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

ELECTRONIC CONTROL AND DIGITAL ELECTRONICS

NQF Level 4

September 2007
ELECTRONIC CONTROL AND DIGITAL ELECTRONICS – LEVEL 4

CONTENTS

SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)
1 Assessment in the National Certificates (Vocational)
2 Assessment framework for vocational qualifications
   2.1 Internal continuous assessment (ICASS)
   2.2 External summative assessment (ESASS)
3 Moderation of assessment
   3.1 Internal moderation
   3.2 External moderation
4 Period of validity of internal continuous assessment (ICASS)
5 Assessor requirements
6 Types of assessment
   6.1 Baseline assessment
   6.2 Diagnostic assessment
   6.3 Formative assessment
   6.4 Summative assessment
7 Planning assessment
   7.1 Collecting evidence
   7.2 Recording
   7.3 Reporting
8 Methods of assessment
9 Instruments and tools for collecting evidence
10 Tools for assessing student performance
11 Selecting and/or designing recording and reporting systems
12 Competence descriptions
13 Strategies for collecting evidence
   13.1 Record sheets
   13.2 Checklists

SECTION C: ASSESSMENT IN ELECTRONIC CONTROL AND DIGITAL ELECTRONICS
1 Schedule of assessment
2 Recording and reporting
3 Internal assessment of Subject Outcomes in Electronic Control and Digital Electronics - Level 4
4 Specifications for external assessment in Electronic Control and Digital Electronics - Level 4
   4.1 Integrated summative assessment task (ISAT)
   4.2 National Examination
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 Electronic Control and Digital Electronics 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: Electronic Control and Digital Electronics to prepare for and deliver Electronic Control and Digital Electronics. 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.

Department of Education
• **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 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.

<table>
<thead>
<tr>
<th>LECTURER ASSESSMENT</th>
<th>The lecturer assesses students’ performance against given criteria in different contexts, such as individual work, group work, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF-ASSESSMENT</td>
<td>Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.</td>
</tr>
<tr>
<td>PEER ASSESSMENT</td>
<td>Students assess another student’s or group of students’ performance against given criteria in different contexts, such as individual work, group work, etc.</td>
</tr>
<tr>
<td>GROUP ASSESSMENT</td>
<td>Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.</td>
</tr>
</tbody>
</table>

9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE
All evidence collected for assessment purposes is kept or recorded in the student’s 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

<table>
<thead>
<tr>
<th>Observation-based (Less structured)</th>
<th>Task-based (Structured)</th>
<th>Test-based (More structured)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Observation</td>
<td>• Assignments or tasks</td>
<td>• Examinations</td>
</tr>
<tr>
<td>• Class questions</td>
<td>• Projects</td>
<td>• Class tests</td>
</tr>
<tr>
<td>• Lecturer, student, parent discussions</td>
<td>• Investigations or research</td>
<td>• Practical examinations</td>
</tr>
<tr>
<td></td>
<td>• Case studies</td>
<td>• Oral tests</td>
</tr>
<tr>
<td></td>
<td>• Practical exercises</td>
<td>• Open-book tests</td>
</tr>
<tr>
<td></td>
<td>• Demonstrations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Role-play</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Interviews</td>
<td></td>
</tr>
</tbody>
</table>

#### Assessment instruments
- Observation
- Class questions
- Lecturer, student, parent discussions

#### Assessment tools
- Observation sheets
- Lecturer's notes
- Comments

#### 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.

<table>
<thead>
<tr>
<th>Observation sheets</th>
<th>Checklists</th>
<th>Marks (e.g. %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer's notes</td>
<td>Rating scales</td>
<td>Rating scales (1-7)</td>
</tr>
<tr>
<td>Comments</td>
<td>Rubrics</td>
<td></td>
</tr>
</tbody>
</table>

#### 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. 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. Using rubrics is a different way of assessing 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 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 what criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN ELECTRONIC CONTROL AND DIGITAL ELECTRONICS

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 PoE account for the other 50 percent.

The PoE and the external assessment include practical and written components. The practical assessment in Electronic Control and Digital Electronics 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

Electronic Control and Digital Electronics, 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

<table>
<thead>
<tr>
<th>RATING CODE</th>
<th>RATING</th>
<th>MARKS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Outstanding</td>
<td>80-100</td>
</tr>
<tr>
<td>4</td>
<td>Highly Competent</td>
<td>70-79</td>
</tr>
<tr>
<td>3</td>
<td>Competent</td>
<td>50-69</td>
</tr>
<tr>
<td>2</td>
<td>Not yet competent</td>
<td>40-49</td>
</tr>
<tr>
<td>1</td>
<td>Not achieved</td>
<td>0-39</td>
</tr>
</tbody>
</table>

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 PoE must include at least:

- 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.
ASSESSMENT OF
ELECTRONIC CONTROL AND DIGITAL ELECTRONICS
LEVEL 4
### 3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN ELECTRONIC CONTROL AND DIGITAL ELECTRONICS - LEVEL 4

#### Topic 1: Replacing faulty components on a PC board and basic design procedures

<table>
<thead>
<tr>
<th>SUBJECT OUTCOME</th>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Apply safety precautions and demonstrate procedures when replacing components.</td>
<td>- Safety procedures and manual dexterity are demonstrated when soldering and desoldering and handling MOSFET components.</td>
<td>- Demonstrate safety procedures followed when soldering and desoldering on a PC board and on viro board.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Demonstrate the manual dexterity needed to remove and replace a variety of components on a PC board.</td>
</tr>
</tbody>
</table>

**ASSESSMENT TASKS OR ACTIVITIES**

Demonstrations of safety procedures and up to standard work are given when soldering or desoldering using PC boards or viro boards.

<table>
<thead>
<tr>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Safety procedures and manual dexterity are demonstrated when soldering and desoldering and handling MOSFET components.</td>
<td>- Demonstrate precautions taken when handling circuit boards containing MOSFET components.</td>
</tr>
</tbody>
</table>

**ASSESSMENT TASKS OR ACTIVITIES**

Demonstrations of safety precautions taken when handling MOSFET boards as well as verbal or written explanation of why the precautions are taken.

<table>
<thead>
<tr>
<th>SUBJECT OUTCOME</th>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 Demonstrate ability to read and interpret semi-conductor manuals.</td>
<td>- Technical manuals are used to find operational limits, replacement parts and other data for semi-conductor devices.</td>
<td>- Show how to find any semi-conductors operational limits by using technical manuals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Interpret the data found in technical manuals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Show how to look up replacement parts in technical manuals.</td>
</tr>
</tbody>
</table>

**ASSESSMENT TASKS OR ACTIVITIES**

Demonstrations are given of the ability to extract information from a semi-conductor manual for any given semi-conductor device that appears in that manual.
### SUBJECT OUTCOME

**1.3 Construct basic electronic circuits.**  
*Range: Includes components such as resistors, capacitors, inductors, diodes, transistors and analogue op-amps. Mounting can be done on viro board.*

<table>
<thead>
<tr>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Timing, filter and oscillator circuits are described in terms of their uses, applications and functioning. The circuits are all built and tested.</td>
<td>• Describe the uses, application and functioning of timing circuits.</td>
</tr>
<tr>
<td></td>
<td>• Describe the uses, application and functioning of filter circuits.</td>
</tr>
<tr>
<td></td>
<td>• Describe the uses, application and functioning of oscillator circuits.</td>
</tr>
<tr>
<td></td>
<td>• Demonstrate the ability to design, construct and test timing, filter and oscillator circuits observing the appropriate safety precautions and using the appropriate test equipment.</td>
</tr>
</tbody>
</table>

**ASSESSMENT TASKS OR ACTIVITIES**

- Timing, filter, oscillator and inverter circuits are described in terms of their uses, applications and functioning verbally or in writing.
- Timing, filter and oscillator circuits described above are to be built and tested practically.

### ASSESSMENT STANDARD

<table>
<thead>
<tr>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inverter circuits are described in terms of their uses, applications and functioning.</td>
<td>• Describe the uses, application and functioning of an inverting power supply with the aid of a block diagram.</td>
</tr>
</tbody>
</table>

**ASSESSMENT TASKS OR ACTIVITIES**

Timing, filter, oscillator and inverter circuits are described in terms of their uses, applications and functioning verbally or in writing.

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### Topic 2: Binary decoding and loading software onto a computer

**SUBJECT OUTCOME**

**2.1 Demonstrate an ability to understand binary code.**

<table>
<thead>
<tr>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Variety of binary codes are named, prepared and interpreted.</td>
<td>• Name a variety of weighted and complementary binary codes, binary coded decimals and alphanumeric codes.</td>
</tr>
<tr>
<td></td>
<td>• Prepare and produce a variety of weighted and complementary binary codes and binary coded decimals.</td>
</tr>
<tr>
<td>• Floating point binary numbers are interpreted into their decimal equivalents.</td>
<td>• Interpret the decimal equivalents of any given floating point binary number.</td>
</tr>
</tbody>
</table>

**ASSESSMENT TASKS OR ACTIVITIES**

- Examples of weighted and complementary codes are named, prepared and interpreted in writing. Alphanumeric codes are named and interpreted from a given table in writing.
- Decimal equivalents from binary floating point numbers are calculated in writing without the use of a calculator.
## SUBJECT OUTCOME

### 2.2 Demonstrate an ability to load software onto a computer.

<table>
<thead>
<tr>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object-driven software is loaded onto a functioning computer.</td>
<td>Demonstrate an ability to load a variety of object-driven software onto a functioning computer.</td>
</tr>
<tr>
<td>Problems that affect the normal operation of computer software are explained in terms of effect, possible origins, cures and preventions.</td>
<td>Explain what types of problems that can affect the proper running of computer software and explain the possible origins, cures and preventions of these problems.</td>
</tr>
</tbody>
</table>

### ASSESSMENT TASKS OR ACTIVITIES

- Loading of software is demonstrated.
- Problems such as bugs, viruses and corrupted software are explained verbally or in writing.

---

## Topic 3: Operating PLCs

### SUBJECT OUTCOME

### 3.1 Explain synchro-server motors.

<table>
<thead>
<tr>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncro-server motors are described and explained in terms of the symbols, operation, construction, and applications thereof.</td>
<td>Sketch the commonly used symbols in synchro-server motors.</td>
</tr>
<tr>
<td></td>
<td>Explain the operation and construction of synchro-server motors.</td>
</tr>
<tr>
<td></td>
<td>List brief descriptions of applications of synchro-server motors.</td>
</tr>
</tbody>
</table>

### ASSESSMENT TASKS OR ACTIVITIES

- All commonly used symbols of synchro-server motors are sketched on paper or appropriate medium.
- Explanation of operation, construction and applications of synchro-server motors is explained verbally or in writing.

---

### SUBJECT OUTCOME

### 3.2 Design and fault-find simple control circuits.

<table>
<thead>
<tr>
<th>ASSESSMENT STANDARD</th>
<th>LEARNING OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladder logic diagrams are used to analyse, design, interpret and solve simple mechanical problems.</td>
<td>Interpret the workings of simple ladder logic diagrams.</td>
</tr>
<tr>
<td></td>
<td>Solve simple problems using ladder logic diagrams.</td>
</tr>
<tr>
<td></td>
<td>Design and build simple solutions to repetitive mechanical actions using ladder logic diagrams.</td>
</tr>
<tr>
<td></td>
<td>Analyse simple faults occurring in a PLC circuit.</td>
</tr>
</tbody>
</table>

### ASSESSMENT TASKS OR ACTIVITIES

Diagrams for solutions to problems are done in writing and demonstrated using a PLC simulator.
4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN ELECTRONIC CONTROL AND DIGITAL ELECTRONICS - LEVEL 4

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 during 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 during 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 is suggested:

<table>
<thead>
<tr>
<th>LEVEL 4</th>
<th>KNOWLEDGE AND COMPREHENSION</th>
<th>APPLICATION</th>
<th>ANALYSIS, SYNTHESIS AND EVALUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50-60%</td>
<td>30-40%</td>
<td>0-10%</td>
</tr>
</tbody>
</table>