



**Republic of Namibia**

# **MINISTRY OF EDUCATION, ARTS AND CULTURE**

## **JUNIOR SECONDARY PHASE**

### **TECHNICAL STUDIES C SYLLABUS**

**Module 1: Bricklaying and Plastering**

**Module 2: Electricity and Electronics**

**Module 3: Plumbing and Pipe Fitting**

**GRADE 8 & 9**

**For implementation:**

**Grade 8 in 2025**

**and**

**Grade 9 in 2026**

Ministry of Education, Arts and Culture  
National Institute for Educational Development (NIED)  
Private Bag 2034  
Okahandja  
Namibia

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*Technical Studies C Syllabus, Grade 8 & 9*

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## Table of contents

|      |                                                           |    |
|------|-----------------------------------------------------------|----|
| 1.   | Introduction .....                                        | 1  |
| 2.   | Rationale.....                                            | 1  |
| 3.   | Aims.....                                                 | 2  |
| 4.   | Inclusive education .....                                 | 2  |
| 5.   | Links to other subjects and cross-curricular issues ..... | 2  |
| 6.   | Approach to teaching and learning.....                    | 4  |
| 7.   | End-of-phase competencies.....                            | 4  |
| 8.   | Summary of the learning content .....                     | 6  |
| 9.   | Learning content .....                                    | 8  |
| 9.1. | Grade 8 learning content.....                             | 9  |
| 9.2. | Grade 9 learning content.....                             | 23 |
| 10.  | Assessment .....                                          | 38 |
| 10.1 | Types and methods of assessment.....                      | 38 |
| 10.2 | Grade descriptors .....                                   | 39 |
| 10.3 | Assessment objectives.....                                | 40 |
| 10.4 | Continuous assessment: detailed guidelines.....           | 40 |
| 10.5 | End-of-year examinations: detailed guidelines .....       | 42 |
| 10.6 | Specification grid.....                                   | 44 |
|      | Annexe 1: Glossary of terms .....                         | 45 |
|      | Annexe 2: List of tools, equipment and materials .....    | 47 |
|      | Annexe 3: Assessment record sheet for grade 8 .....       | 48 |
|      | Annexe 4: Assessment record sheet for grade 9 .....       | 49 |



## **1. INTRODUCTION**

The Technical Studies C syllabus describes the intended learning and assessment for Bricklaying and Plastering, Electricity and Electronics as well as Plumbing and Pipe Fitting in the Junior Secondary phase. As a subject, Technical Studies C is within the technological area of learning in the curriculum, but has thematic links to other subjects across the curriculum. Learning about technology includes applying knowledge of how to work more efficiently using tools, materials and processes. Technology is a specific way of solving problems through planning, design, realisation and evaluation. Learners develop the necessary knowledge, skills and attitudes to perform tasks using appropriate technology.

## **2. RATIONALE**

The presentation of Technical Studies C at school is first and foremost an educational matter, with the overall goal being that learners attain proper adulthood in the society. As a result of the increasing industrialisation and mechanisation of modern times, technological knowledge and skills have become indispensable in everyday life.

The inclusion of Technical Studies C in the learners' curriculum does not aim at vocational training in the narrow sense of the word. It simply provides the learner with a broad educational foundation for further specialised training. It also provides the learners with a clear understanding of technology and assists them in becoming better adapted and prepared for life. Technical Studies C has its main focus on the building industry.

The integration of entrepreneurial concepts and activities lays the foundation for the development of human resources as a basis for studies, occupations or self-employment. Technical Studies C, together with entrepreneurial concepts and activities, empowers the individual to be creative and gain problem-solving skills.

The particular features of Technical Studies C at this phase are to enable the learners to achieve technological literacy through the development of:

- technological knowledge and understanding
- technological capacity and
- an awareness of the significance of Technical Studies C (Bricklaying and Plastering, Electricity and Electronics as well as Plumbing and Pipe Fitting) upon society.

Learners should develop a thorough knowledge of basic concepts which they can apply in a wide range of situations. They must also develop the broad-based skills that are so important for effective functioning in the world of work. They must learn to identify and analyse problems and to explore and test solutions in a wide variety of contexts. This firm conceptual base is at the heart of the Technical Studies C syllabus and must be the focus on teaching and learning in the classroom.

### 3. AIMS

Technical Studies C promotes the following aims in the curriculum:

- foster an awareness of local, regional and national needs of Namibia and contribute towards development
- equip learners to play an effective and productive role in the economic life of the nation
- help learners to develop pre-vocational skills
- promote positive attitudes towards the challenges of co-operation, work, entrepreneurship and self-employment.

### 4. INCLUSIVE EDUCATION

Inclusive education is the right of every learner and promotes participation in, or access to, the full range of educational programmes and services offered by the education system in mainstream schools. It is based on the principle of supporting and celebrating the diversity found among all learners and removing all barriers to learning. The Technical Studies C teacher in the Junior Secondary phase should therefore accommodate learners with special educational needs by adapting this syllabus to the needs of the learner through differentiation of teaching methods and material as indicated in the *Inclusive Education Curriculum Framework (2023)*. The adaptation for assessment of learners with special educational needs must be done as prescribed in the *Handbook for Centres (2022)* by the Directorate of National Examinations and Assessment (DNEA). The accommodations prescribed in this handbook are not only for external examinations, but apply to learners from Grades 1 to 12.

Basic education prepares the society, as envisaged in Namibia's Vision 2030, by promoting inclusivity. Learners experiencing barriers to learning and other individual needs will be included in a mainstream school and their needs will be attended to through differentiation of teaching methods and materials as required. Learners, who are so severely impaired that they cannot benefit from attending inclusive schools, will be provided for according to their needs in learning support units, resource units or resource schools until such time that they can join the inclusive school where applicable. The curriculum, teaching methods and materials are adapted for learners in these institutions.

Technical Studies C promotes equal opportunity for males and females, enabling both to participate equally. Teachers should know and understand how to treat learners equally, and all materials should support gender fairness. Including gender perspectives is important in all social themes in order to raise awareness of gender stereotyping, how limitations are set on gender equity, and how to promote gender equity in all spheres of life. All teaching/learning materials should be analysed to ensure that they promote gender equity.

### 5. LINKS TO OTHER SUBJECTS AND CROSS-CURRICULAR ISSUES

The cross-curricular issues include Environmental Learning, HIV and AIDS, Population Education, Education for Human Rights and Democracy (EHRD), Information and Communication Technology (ICT) and Road Safety. These issues have been introduced to the formal curriculum, because each of the issues deals with particular risks and challenges in our Namibian society. They should be dealt with across all phases and in every subject where the topics overlap with the content of that subject.

All of our learners need to:

- understand the nature of these risks and challenges
- know how they will impact on our society and on the quality of our people's lives now and in future
- understand how these risks and challenges can be addressed on a national and global level
- understand how each learner can play a part in addressing these risks and challenges in their own school and local community.

The main risks and challenges have been identified as:

- the challenges and risks we face if we do not care for and manage our natural resources
- the challenges and risks caused by HIV and AIDS
- the challenges and risks to health caused by pollution, poor sanitation and waste
- the challenges and risks to democracy and social stability caused by inequity and governance that ignores rights and responsibilities
- the challenges and risks we face if we do not adhere to road safety measures
- the challenges and risks we face from globalisation.

In this syllabus the following cross-curricular issues can be dealt with as indicated:

| Grade | HIV and AIDS                              | Environmental learning                                                                          | EHRD             | Entrepreneurship Education | ICT                                                          |
|-------|-------------------------------------------|-------------------------------------------------------------------------------------------------|------------------|----------------------------|--------------------------------------------------------------|
| 8     | Health and safety                         | Building materials<br>Materials<br>Cell/batteries<br>Water supply<br>Welding                    | Career prospects | Job shadowing              | Sketches<br>Design and realisation<br>Communication          |
| 9     | Safety precautions and first aid measures | Building sites<br>Building structures<br>Materials<br>Cell/batteries<br>Water supply<br>Welding | Human Resource   | Job observation            | Building sketches<br>Design and realisation<br>Communication |

## **6. APPROACH TO TEACHING AND LEARNING**

The approach to teaching and learning is based on a paradigm of learner-centred education (LCE) described in ministerial policy documents and the LCE conceptual framework. This approach ensures optimal quality of learning when the principles are put into practice.

The aim is to develop learning with understanding, and the knowledge, skills and attitudes to contribute to the development of society. The starting point for teaching and learning is the fact that the learner brings to the school a wealth of knowledge and social experience gained continually from the family, the community, and through interaction with the environment. Learning in school should involve, build on, extend and challenge the learner's prior knowledge and experience.

Learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production. At the same time, each learner is an individual with his/her own needs, pace of learning, experience and abilities. The teacher must be able to sense the needs of learners, the nature of the learning to be done, and how to shape learning experience accordingly. Teaching strategies must therefore be varied but flexible within well-structured sequence of lessons.

The teacher must decide, in relation to the general and specific objectives to be achieved, when it is best to convey content directly; when it is best to let learners discover or explore information for themselves; when they need directed learning; when they need reinforcement or enrichment learning; when there is a particular progression of skills or information that needs to be followed; or when the learners can be allowed to find their own way through a topic or area of content.

Work in groups, in pairs, individually, or as a whole class must therefore be organised as appropriate to the task at hand. Co-operative and collaborative learning should be encouraged wherever possible. In such cases, tasks must be designed so that pair or group work is needed to complete it, otherwise the learners will not see any relevance in carrying out tasks together. As the learners develop personal, social and communication skills, they can gradually be given increasing responsibility to participate in planning and evaluating their work, under the teacher's guidance. Practical work is essential for learning skills in Technical Studies C

Technical Studies C emphasises the re-use of locally available resources (recyclable materials) to conserve the environment and the content has been adapted to suit the local context.

## **7. END-OF-PHASE COMPETENCIES**

On entry to the Junior Secondary phase, all learners are expected to have a basic awareness of and some practical skills in pre-vocational subjects within the Namibian school curriculum. They should consider the social and environmental impact of these subjects and also have basic entrepreneurial awareness.

A few learners might not be able to achieve all the specific objectives satisfactorily and must receive learning support through adapted teaching approaches, adapted materials, and assistance from peers. A small number of learners have special educational needs to a degree which requires greater individual attention, resources or assessment. Others will have impairments which do not necessarily limit cognitive and affective learning and development, e.g. the visually impaired, hearing impaired and physically challenged.

On completion of the Junior Secondary phase, learners are expected to be able to demonstrate their competence in simple technological processes and have basic skills in Bricklaying and Plastering, Electricity and Electronics as well as Plumbing and Pipe Fitting. They should be able to make informed choices about design and/or materials and evaluate a finished product in these areas. They should also be able to use basic equipment and know the safety precautions in doing so.

## 8. SUMMARY OF THE LEARNING CONTENT

| Grade 8                                      | Grade 9                                                                                                                                                                                                                  |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module 1: Bricklaying and Plastering</b>  |                                                                                                                                                                                                                          |
| 1.1 Safety                                   | 1.1 Safety precautions and first aid measures                                                                                                                                                                            |
| 1.2 Basic hand tools and machinery           | 1.2 Tools and machinery                                                                                                                                                                                                  |
| 1.3 Trades in the construction industry      | 1.3 Professions in the building industry                                                                                                                                                                                 |
| 1.4 Use and quality of building materials    | 1.4 Building materials                                                                                                                                                                                                   |
| 1.5 Bonding of simple walls                  | 1.5 Bricklaying skills                                                                                                                                                                                                   |
| 1.6 Jointing and pointing                    | 1.6 Basic plastering                                                                                                                                                                                                     |
| 1.7 Choice of building sites                 | 1.7 Setting out of building sites                                                                                                                                                                                        |
| 1.8 Types of foundations                     | 1.8 Setting out and excavation of foundations                                                                                                                                                                            |
| 1.9 Types of floors and damp-proofing        | 1.9 Construction of ground floors and damp-proofing                                                                                                                                                                      |
| 1.10 Types of roof coverings                 | 1.10 Types of roof structures                                                                                                                                                                                            |
| <b>Module 2: Electricity and Electronics</b> |                                                                                                                                                                                                                          |
| 2.1 Safety                                   | 2.1 Safety                                                                                                                                                                                                               |
| 2.2 Tools and equipment                      | 2.2 Tools and equipment <ul style="list-style-type: none"> <li>• Measuring and marking tools</li> <li>• Cutting tools</li> <li>• Holding tools</li> <li>• Driving tools</li> <li>• Wiring tools and equipment</li> </ul> |
| 2.3 Atomic theory                            | 2.3 Electrical terminology                                                                                                                                                                                               |
| 2.4 Cells and batteries                      | 2.4 Cells and batteries                                                                                                                                                                                                  |
| 2.5 Electrical terminology                   | 2.5 Electrical circuits                                                                                                                                                                                                  |

| Grade 8                                                  | Grade 9                                         |
|----------------------------------------------------------|-------------------------------------------------|
| <b>Module 2: Electricity and Electronics (continued)</b> |                                                 |
| 2.6 Electric circuits                                    | 2.6 Conductors and insulating materials         |
| 2.7 Conductors, insulators and semi-conductors           | 2.7 Joining electrical components and materials |
| 2.8 Magnetism                                            | 2.8 Magnetism                                   |
| 2.9 Earthing                                             | 2.9 Earthing and the consumer's circuit         |
| 2.10 Testing                                             | 2.10 Testing                                    |
|                                                          | 2.11 Types of current                           |
| <b>Module 3: Plumbing and Pipe Fitting</b>               |                                                 |
| 3.1 Safety and housekeeping                              | 3.1 Safety and housekeeping                     |
| 3.2 Hand tools                                           | 3.2 Hand tools                                  |
| 3.3 Machines                                             | 3.3 Machines                                    |
| 3.4 Metal- and non-metal materials                       | 3.4 Metal- and non-metal materials              |
| 3.5 Soldering and welding                                | 3.5 Soldering and welding                       |
| 3.6 Cold water supply                                    | 3.6 Cold water supply                           |
| 3.7 Hot water supply                                     | 3.7 Hot water supply                            |
| 3.8 Drainage                                             | 3.8 Drainage                                    |
| 3.9 Sheet metalwork                                      | 3.9 Sheet metalwork                             |
| 3.10 Calculations                                        | 3.10 Calculations                               |

## 9. LEARNING CONTENT

### Introduction to learning content

The learning content outlined below is designed to provide guidance to teachers as to what will be assessed in the overall evaluation of learners. It is not meant to limit, in any way, the teaching programme of any particular school.

Modules and topics refer to those components of the subject which learners are required to study/master.

The **general objectives** are derived from the topic/skill and are the general knowledge, understanding and demonstration of skills on which learners will be assessed.

The **specific objectives** are the detailed and specified content of the syllabus, which learners need to master to achieve the general objectives, and on which they will be assessed. For skills-based subjects, specific objectives indicate what learners should be able to do at the end of the year.

## 9.1. Grade 8 learning content

| TOPIC                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 1: BRICKLAYING AND PLASTERING</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1.1 Safety                                  | <ul style="list-style-type: none"> <li>• understand safety measures in the workplace regarding building constructions</li> <li>• know the different types of safety measures</li> <li>• be aware of safe practices and conditions during work</li> <li>• know health and safety precautions on a building site and workplace</li> <li>• know and understand               <ul style="list-style-type: none"> <li>- emergency situations</li> <li>- first aid kit and</li> <li>- first aid procedures to be applied</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• demonstrate how to store safety equipment and tools in their correct places</li> <li>• identify and apply appropriate basic safety measures relating to:               <ul style="list-style-type: none"> <li>- personal safety</li> <li>- workshop safety</li> <li>- tools and equipment</li> </ul> </li> <li>• apply safety rules and habits when doing practical work</li> <li>• practice health and safety precautions on a building site and workplace</li> <li>• practise safety procedures when injury occurs</li> <li>• identify and explain the uses of the basic content of the first aid kit</li> <li>• list and explain the appropriate basic first aid procedures to be followed with HIV and AIDS in mind</li> <li>• role play an emergency situation</li> </ul> |

| TOPIC                                                        | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                                              | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 1: BRICKLAYING AND PLASTERING (CONTINUED.....)</b> |                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                          |
| 1.2 Basic hand tools and machinery                           | <ul style="list-style-type: none"> <li>know basic hand tools used in bricklaying and plastering and their storage</li> </ul>                                                                                                                                             | <ul style="list-style-type: none"> <li>identify and use tools correctly</li> <li>demonstrate how to store tools and equipments after use</li> </ul>                                                                                                                                                                                                                                      |
| 1.3 Trades in the construction industry                      | <ul style="list-style-type: none"> <li>be familiar with trades in the construction industry</li> </ul>                                                                                                                                                                   | <ul style="list-style-type: none"> <li>name the different trades within the construction industry</li> <li>identify different trades persons at a building site</li> <li>distinguish between the different trades</li> </ul>                                                                                                                                                             |
| 1.4 Use and quality of building materials                    | <ul style="list-style-type: none"> <li>know the use of various building materials used in bricklaying and plastering</li> <li>understand the process of cleaning different building materials</li> <li>show awareness of the need to preserve the environment</li> </ul> | <ul style="list-style-type: none"> <li>list building materials used in bricklaying and plastering</li> <li>use building materials correctly</li> <li>demonstrate how to clean building materials in order to ensure quality</li> <li>collect different building materials from the environment without causing serious damage</li> </ul>                                                 |
| 1.5 Bonding of simple walls                                  | <ul style="list-style-type: none"> <li>know types of bonds used in bricklaying and plastering</li> <li>understand simple bonding rules used in bricklaying and plastering</li> </ul>                                                                                     | <ul style="list-style-type: none"> <li>identify the types of bonds used in bricklaying and plastering</li> <li>describe the types of bonds used in bricklaying and plastering</li> <li>sketch and explain the three commonly used bonds</li> <li>solve bonding problems of walls up to one brick thick</li> <li>apply simple bonding rules used in bricklaying and plastering</li> </ul> |

| TOPIC                                                        | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                           | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 1: BRICKLAYING AND PLASTERING (CONTINUED.....)</b> |                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |
| 1.6 Jointing and pointing                                    | <ul style="list-style-type: none"> <li>understand jointing and pointing used in bricklaying and plastering</li> </ul> | <ul style="list-style-type: none"> <li>name types of joints used in bricklaying and plastering during and after work</li> <li>sketch the types of joints used when jointing and pointing</li> <li>list the advantages and disadvantages of pointing and jointing</li> <li>distinguish between pointing and jointing</li> </ul> |
| 1.7 Choice of building sites                                 | <ul style="list-style-type: none"> <li>understand how to choose a building site</li> </ul>                            | <ul style="list-style-type: none"> <li>list factors influencing the choice of a building site</li> <li>identify suitable sites for building</li> <li>explain the disadvantages of top soil on a building site</li> <li>explain the importance of site clearance and excavation of top soil</li> </ul>                          |
| 1.8 Types of foundations                                     | <ul style="list-style-type: none"> <li>know different types of foundations</li> </ul>                                 | <ul style="list-style-type: none"> <li>name types of foundations commonly used in bricklaying and plastering</li> <li>sketch the different types of foundations</li> <li>explain the advantages and disadvantages of each type of foundation</li> </ul>                                                                        |
| 1.9 Types of floors and damp-proofing                        | <ul style="list-style-type: none"> <li>know different types of floors and damp-proofing</li> </ul>                    | <ul style="list-style-type: none"> <li>list types of floors commonly used in the construction industry</li> <li>identify different types of floors</li> <li>identify different types of damp-proofing materials</li> <li>describe the damp-proofing materials</li> </ul>                                                       |
| 1.10. Types of roof coverings                                | <ul style="list-style-type: none"> <li>understand roof covering materials</li> </ul>                                  | <ul style="list-style-type: none"> <li>list types of roof coverings <ul style="list-style-type: none"> <li>- corrugated iron sheets</li> <li>- thatch</li> <li>- tiles</li> </ul> </li> <li>state the advantages and disadvantages of different roof covering materials</li> </ul>                                             |

| TOPIC                                        | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                              | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 2: ELECTRICITY AND ELECTRONICS</b> |                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2.1 Safety                                   | <ul style="list-style-type: none"> <li>• understand safety measures in the workplace regarding electricity</li> <li>• explore first aid emergency situations.</li> </ul> | <ul style="list-style-type: none"> <li>• identify and apply appropriate basic safety measures relating to: <ul style="list-style-type: none"> <li>- personal safety</li> <li>- workshop safety</li> <li>- tools and equipment</li> <li>- electrical 3-pin plug top and wiring</li> </ul> </li> <li>• list the dangers of electricity</li> <li>• identify general safety symbols and colour codes</li> <li>• identify and explain the uses of the basic content of the first aid kit</li> <li>• explain the appropriate first aid procedures with HIV and AIDS in mind regarding: <ul style="list-style-type: none"> <li>- minor cuts and injuries</li> <li>- open wounds</li> <li>- electrical shock</li> <li>- burns</li> </ul> </li> </ul> |

| TOPIC                                                        | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                    | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED....)</b> |                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2.2 Tools and equipment                                      | <ul style="list-style-type: none"> <li>• know the uses of basic tools and equipment</li> </ul> | <ul style="list-style-type: none"> <li>• identify and use the following hand tools and equipment: <ul style="list-style-type: none"> <li>- screwdrivers/insolated screwdrivers</li> <li>- pliers</li> <li>- soldering wire /soft solder</li> <li>- soldering irons</li> <li>- solder sucker</li> <li>- pipe bender</li> <li>- reamer</li> <li>- pipe vice</li> <li>- draw vice</li> <li>- stock and dies</li> <li>- wire stripper</li> <li>- fish tape</li> <li>- hack saw</li> <li>- multiplier</li> <li>- twist drills</li> <li>- hand drills</li> <li>- breast drills</li> <li>- drilling machines</li> <li>- insulated gloves</li> <li>- insulation tape</li> </ul> </li> </ul> |

| TOPIC                                                        | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                       | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED....)</b> |                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2.3 Atomic theory                                            | <ul style="list-style-type: none"> <li>understand the basic atomic theory</li> </ul>                              | <ul style="list-style-type: none"> <li>explain and illustrate the composition of atoms</li> <li>describe the movement of electrons that produces electricity</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2.4 Cells and batteries                                      | <ul style="list-style-type: none"> <li>understand cells and batteries as a source of electrical energy</li> </ul> | <ul style="list-style-type: none"> <li>explain how cells and batteries are a source of electrical energy</li> <li>differentiate between primary and secondary cells</li> <li>describe the difference between the types of cells by identifying the components of cells and batteries</li> <li>list the advantages and disadvantages of cells and batteries</li> </ul>                                                                                                                                                                                                                                                                              |
| 2.5 Electrical terminology                                   | <ul style="list-style-type: none"> <li>understand a simple Direct Current (DC) circuit</li> </ul>                 | <ul style="list-style-type: none"> <li>describe the following terms in a simple DC circuit: <ul style="list-style-type: none"> <li>voltage</li> <li>current and</li> <li>resistance</li> </ul> </li> <li>list the symbols and units for: <ul style="list-style-type: none"> <li>voltage</li> <li>current and</li> <li>resistance</li> </ul> </li> <li>describe Ohm's law</li> <li>perform simple calculations by applying Ohm's Law</li> <li>carry out simple experiments to determine the relationship in a simple DC circuit between: <ul style="list-style-type: none"> <li>voltage</li> <li>current</li> <li>resistance</li> </ul> </li> </ul> |

| TOPIC                                                        | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                  | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED....)</b> |                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                    |
| 2.6 Electric circuits                                        | <ul style="list-style-type: none"> <li>be familiar with simple circuit diagrams</li> </ul>                                                                                   | <ul style="list-style-type: none"> <li>distinguish between the different components in an electrical circuit</li> <li>draw simple electric circuit diagrams using different components /symbols</li> <li>build appropriate electric circuits for specific functions by making use of appropriate components.</li> </ul>                                            |
| 2.7 Conductors, insulators and semiconductors                | <ul style="list-style-type: none"> <li>know conductors, insulators and semi-conductors</li> <li>know the materials for conductors, insulators and semi-conductors</li> </ul> | <ul style="list-style-type: none"> <li>differentiate between the following terms: <ul style="list-style-type: none"> <li>conductors</li> <li>insulators</li> <li>semiconductors</li> </ul> </li> <li>identify the types of materials for: <ul style="list-style-type: none"> <li>conductors</li> <li>insulators and</li> <li>semiconductors</li> </ul> </li> </ul> |
| 2.8 Magnetism                                                | <ul style="list-style-type: none"> <li>know the properties of magnets</li> <li>be familiar with magnetic fields</li> </ul>                                                   | <ul style="list-style-type: none"> <li>state the properties of magnetism</li> <li>draw/sketch a magnetic field</li> </ul>                                                                                                                                                                                                                                          |
| 2.9 Earthing                                                 | <ul style="list-style-type: none"> <li>know concepts related to earthing</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>differentiate between the following terms: <ul style="list-style-type: none"> <li>earthed</li> <li>earth conductor</li> <li>earth continuity conductor</li> <li>earth electrode</li> </ul> </li> </ul>                                                                                                                      |
| 2.10 Testing                                                 | <ul style="list-style-type: none"> <li>know various testing instruments when wiring simple circuits</li> </ul>                                                               | <ul style="list-style-type: none"> <li>demonstrate different testing instruments regarding: <ul style="list-style-type: none"> <li>voltage</li> <li>current</li> <li>resistance</li> </ul> </li> </ul>                                                                                                                                                             |

| TOPIC                                      | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                      | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING</b> |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3.1 Safety and housekeeping                | <ul style="list-style-type: none"> <li>• know the concept "safety and housekeeping"</li> <li>• know cleaning materials and equipment</li> <li>• understand emergency situations, first aid kit and first aid procedures to be applied</li> </ul> | <ul style="list-style-type: none"> <li>• define the term Personal Protective Equipment (PPE)</li> <li>• identify the different types and uses of personal protective clothing and equipment used in plumbing operations</li> <li>• identify the safety signs and explain the meaning of symbols used in the workshop and industry</li> <li>• name the elements of fire: <ul style="list-style-type: none"> <li>- oxygen</li> <li>- heat</li> <li>- fuel</li> </ul> </li> <li>• identify the cleaning materials and cleaning equipment: <ul style="list-style-type: none"> <li>- water</li> <li>- soap</li> <li>- acid</li> <li>- wiping paper</li> <li>- cloth</li> <li>- vacuum cleaner</li> <li>- cleaning trolley</li> <li>- broom</li> <li>- mop</li> </ul> </li> <li>• role play an emergency situation</li> <li>• identify and explain the uses of the basic contents of a first aid kit</li> <li>• list and explain the appropriate basic first aid procedures to be followed with HIV and AIDS in mind</li> </ul> |

| TOPIC                                                      | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                                                    | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED....)</b> |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3.2 Hand tools                                             | <ul style="list-style-type: none"> <li>know different kinds of hand tools used in plumbing and pipe fitting and their uses</li> </ul>                                                                                                                                          | <ul style="list-style-type: none"> <li>identify the different kinds of hand tools used in plumbing and pipe fitting and explain their uses: <ul style="list-style-type: none"> <li>- hacksaw</li> <li>- tube cutters</li> <li>- cutting snips</li> <li>- spirit level</li> <li>- soldering gun</li> <li>- pex clamps</li> <li>- water pump plier</li> <li>- pipe wrench</li> <li>- pipe reamer</li> <li>- silicon gun</li> <li>- rivet gun</li> </ul> </li> </ul>                                                                 |
| 3.3 Machines                                               | <ul style="list-style-type: none"> <li>understand with the safe use, maintenance and storage of plumbing hand tools</li> <li>know the different machines used in plumbing and pipe fitting and their uses</li> <li>understand safety measures used for each machine</li> </ul> | <ul style="list-style-type: none"> <li>apply the safe use, maintenance and storage of hand tools</li> <li>identify the different machines used in plumbing and pipefitting and state their uses: <ul style="list-style-type: none"> <li>- sheet metalwork machines</li> <li>- electrical machines</li> <li>- portable electrical tools</li> </ul> </li> <li>describe the safety precautions applicable to each machine</li> <li>apply the safe use and care for a range of machine tools used in the plumbing industry</li> </ul> |
| 3.4 Metals and non-metal materials                         | <ul style="list-style-type: none"> <li>understand metals</li> </ul>                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>differentiate between the types of metals: <ul style="list-style-type: none"> <li>- ferrous</li> <li>- non-ferrous</li> <li>- alloys</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                     | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3.4 Metals and non-metal materials (continued)              | <ul style="list-style-type: none"> <li>understand metals (continued)</li> </ul> | <ul style="list-style-type: none"> <li>define the following properties of metals:               <ul style="list-style-type: none"> <li>conductivity</li> <li>malleability</li> <li>toughness</li> <li>elasticity</li> <li>expansion and contraction</li> <li>resistance to corrosion</li> </ul> </li> <li>discuss the following metals with regards to their types, properties and uses               <ul style="list-style-type: none"> <li>copper</li> <li>aluminium</li> <li>cast iron</li> <li>brass</li> <li>stainless steel</li> </ul> </li> <li>explain the term non-metals</li> <li>describe the different types of non-metals:               <ul style="list-style-type: none"> <li>polymers</li> <li>fiberglass</li> <li>bitumen</li> </ul> </li> <li>describe the uses of non-metal materials</li> </ul> |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                              | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3.5 Soldering and welding                                   | <ul style="list-style-type: none"> <li>• know the concepts soft and hard soldering</li> <li>• know soldering tools, equipment, accessories and materials</li> <li>• understand the basics of manual metal arc and gas welding</li> </ul> | <ul style="list-style-type: none"> <li>• distinguish between soft and hard soldering</li> <li>• identify the purpose and applications of soft and hard soldering</li> <li>• identify and state the uses of the different types of tools, equipment, accessories and materials used in soft and hard soldering: <ul style="list-style-type: none"> <li>- soldering stick</li> <li>- gas-fired furnaces</li> <li>- flux e.g. hydrochloric acid, resin and tallow</li> <li>- sal-ammoniac stone/block</li> <li>- soldering iron</li> </ul> </li> <li>• identify an arc welding machine and its components</li> <li>• identify oxy-acetylene welding equipment and its components</li> <li>• demonstrate welding techniques</li> <li>• describe the properties of water with regard to the following: <ul style="list-style-type: none"> <li>- smell, colour and taste</li> <li>- boiling point and freezing point</li> <li>- expansion and contraction</li> <li>- density</li> </ul> </li> </ul> |
| 3.6 Cold water supply                                       | <ul style="list-style-type: none"> <li>• understand domestic cold water supply</li> </ul>                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                    | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3.6 Cold water supply<br>(continued)                        | <ul style="list-style-type: none"> <li>understand domestic cold water supply (continued)</li> <li>know water pipes, fittings/joints</li> </ul> | <ul style="list-style-type: none"> <li>discuss the following sources of water used for human consumption and describe their advantages and disadvantages: <ul style="list-style-type: none"> <li>wells and boreholes</li> <li>fountains (springs)</li> <li>rivers and dams</li> <li>ocean</li> </ul> </li> <li>identify different types of pipes and fittings/joints: <ul style="list-style-type: none"> <li>copper</li> <li>galvanized</li> <li>polyvinyl chloride (PVC)</li> <li>pex</li> </ul> </li> </ul>                                                                                                                                          |
| 3.7 Hot water supply                                        | <ul style="list-style-type: none"> <li>understand basic domestic hot water supply</li> <li>know different types of heating units</li> </ul>    | <ul style="list-style-type: none"> <li>define the term heat</li> <li>identify and explain the types of heat transfer: <ul style="list-style-type: none"> <li>radiation</li> <li>conduction</li> <li>convection</li> </ul> </li> <li>list the different types of hot water heating units: <ul style="list-style-type: none"> <li>boiler and cylinder supply system</li> <li>combination hot water geyser (low pressure)</li> <li>high pressure geyser (electric geyser)</li> <li>push through geyser</li> <li>solar heating collectors</li> </ul> </li> <li>explain the advantages and disadvantages of each type of hot water installation.</li> </ul> |

| TOPIC                                                  | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                        | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED)</b> |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3.8 Drainage                                           | <ul style="list-style-type: none"> <li>know a basic domestic drainage system</li> </ul>                            | <ul style="list-style-type: none"> <li>explain the term drainage and name the components of a drainage system</li> <li>define the following drainage terms: <ul style="list-style-type: none"> <li>drain</li> <li>sewage</li> <li>waste water</li> <li>soil water</li> <li>waste pipe</li> <li>soil pipe</li> <li>gully</li> <li>rodding eye</li> </ul> </li> <li>identify and describe the uses of the following pipes: <ul style="list-style-type: none"> <li>earth ware pipe</li> <li>u-PVC pipe</li> <li>cast iron pipe</li> <li>pitch fibre pipe</li> </ul> </li> <li>demonstrate the installation of a drainage system</li> </ul> |
| 3.9 Sheet metalwork                                    | <ul style="list-style-type: none"> <li>understand basic sheet metal work as part of plumbing operations</li> </ul> | <ul style="list-style-type: none"> <li>list the different types and uses of sheet metal work tools and equipment</li> <li>apply basic geometric used in sheet metal work</li> <li>demonstrate the procedure for constructing geometric forms</li> <li>explain the different types and applications of joints used in sheet metal work</li> <li>explain the properties, functions and applications of the materials used in sheet metalwork</li> <li>explain the hazards associate with sheet metal work</li> </ul>                                                                                                                      |

| TOPIC                                                      | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                                                                                                                          | GRADE 8 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED....)</b> |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3.9 Sheet metalwork (continued)<br>3.10 Calculation        | <ul style="list-style-type: none"> <li>• know basic drawing and sketches used in sheet metalwork</li> <li>• know the formulae to calculate the circumferences, areas and volumes for different figures applicable in the plumbing industry</li> <li>• know the applicable SI (International System of Units) metric units of measurements</li> </ul> | <ul style="list-style-type: none"> <li>• draw and identify from given drawings, the different types of joints used in sheet metalwork</li> <li>• define the following terms: <ul style="list-style-type: none"> <li>- circumference</li> <li>- area</li> <li>- volume</li> </ul> </li> <li>• state the formulae to calculate the circumferences, areas and volumes for different figures applicable in the plumbing industry: <ul style="list-style-type: none"> <li>- square</li> <li>- circle</li> <li>- rectangle</li> <li>- cube</li> <li>- cylinder</li> </ul> </li> <li>• describe the link between different SI metric units of measurements</li> <li>• apply the following measuring tools: <ul style="list-style-type: none"> <li>- tape measure</li> <li>- steel ruler</li> <li>- vernier caliper</li> </ul> </li> </ul> |

## 9.2. Grade 9 learning content

| TOPIC                                         | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                  | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                       |
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| <b>MODULE 1: BRICKLAYING AND PLASTERING</b>   |                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1.1 Safety precautions and first aid measures | <ul style="list-style-type: none"> <li>understand the importance of safety at the work site</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>explain the importance of safety at the work site</li> <li>apply first aid measures when handling injury</li> <li>apply safety measures at a building site</li> <li>identify suitable protective clothing and equipment when doing practical work</li> </ul>                                                                                                                     |
| 1.2 Tools and machinery                       | <ul style="list-style-type: none"> <li>know the proper use and maintenance of tools and equipment</li> </ul>                                                                                                                 | <ul style="list-style-type: none"> <li>explain the proper handling of tools</li> <li>use different tools correctly</li> <li>use tools and equipment with care</li> </ul>                                                                                                                                                                                                                                                |
| 1.3 Professions in the building industry      | <ul style="list-style-type: none"> <li>know the professions within the building industry</li> <li>understand the relationship between entrepreneurship and professions in the building industry</li> </ul>                   | <ul style="list-style-type: none"> <li>identify and name different professions within the building industry</li> <li>list the specific responsibilities of different professionals within the building industry</li> <li>distinguish between the roles of different professionals within the building industry</li> <li>select a profession and draw up a relevant business plan to start their own business</li> </ul> |
| 1.4 Building materials                        | <ul style="list-style-type: none"> <li>know basic quality control tests on building materials</li> <li>understand how to calculate the quantities of materials needed and the cost of simple walls and structures</li> </ul> | <ul style="list-style-type: none"> <li>test building materials for cleanliness, workability and absorbency</li> <li>calculate quantities of materials and total cost for specific projects</li> </ul>                                                                                                                                                                                                                   |

| TOPIC                                                      | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                               | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                             |
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| <b>MODULE 1: BRICKLAYING AND PLASTERING (CONTINUED...)</b> |                                                                                                                                                           |                                                                                                                                                                                                                                                               |
| 1.5 Bricklaying skills                                     | <ul style="list-style-type: none"> <li>acquire skills in handling and laying of bricks</li> </ul>                                                         | <ul style="list-style-type: none"> <li>lay bricks correctly to a building line</li> <li>cut bricks to specific sizes</li> <li>raise a corner using a gauge rod</li> </ul>                                                                                     |
| 1.6 Basic plastering                                       | <ul style="list-style-type: none"> <li>know how to apply mortar in joints during the bricklaying process</li> <li>know plastering materials</li> </ul>    | <ul style="list-style-type: none"> <li>spread mortar forming a uniform bed joint</li> <li>select suitable plastering materials</li> <li>sieve materials such as pit sand and river sand</li> <li>gauge plastering materials using standard mixes</li> </ul>   |
| 1.7 Setting out of building sites                          | <ul style="list-style-type: none"> <li>understand setting out methods</li> </ul>                                                                          | <ul style="list-style-type: none"> <li>explain the procedure of setting out a building using the 3,4,5 and squaring methods</li> <li>set out simple building projects</li> </ul>                                                                              |
| 1.8 Setting out and excavation of foundations.             | <ul style="list-style-type: none"> <li>understand how to determine the position and size of foundation trenches</li> </ul>                                | <ul style="list-style-type: none"> <li>explain the required depth and width of foundation trenches</li> <li>set out simple foundations</li> <li>check for squareness on the newly set out foundation</li> <li>excavate simple building foundations</li> </ul> |
| 1.9 Construction of ground floors and damp-proofing        | <ul style="list-style-type: none"> <li>understand the construction of simple ground floors</li> <li>know about the use of damp-proof materials</li> </ul> | <ul style="list-style-type: none"> <li>place and consolidate hardcore</li> <li>mix and compact concrete slabs</li> <li>list the different damp-proof materials (dpm) used for solid ground floors</li> </ul>                                                  |
| 1.10 Types of roof structures                              | <ul style="list-style-type: none"> <li>understand simple roof structures</li> </ul>                                                                       | <ul style="list-style-type: none"> <li>identify and name the types of roof structures used in the building industry</li> <li>state advantages and disadvantages of different roof structures</li> </ul>                                                       |

| TOPIC                                        | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                        | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>MODULE 2: ELECTRICITY AND ELECTRONICS</b> |                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2.1 Safety                                   | <ul style="list-style-type: none"> <li>• know safety measures in the workplace regarding electricity</li> <li>• understand first aid procedures</li> </ul>                                                                         | <ul style="list-style-type: none"> <li>• identify and apply appropriate basic safety measures relating to: <ul style="list-style-type: none"> <li>- personal safety</li> <li>- workshop safety</li> <li>- tools and equipment</li> <li>- electrical socket outlets and wiring</li> </ul> </li> <li>• identify general safety symbols and colour codes</li> <li>• role play an emergency situation</li> </ul>                                                                                                                                                                                                                                                                                                                           |
| 2.2 Tools and equipment                      | <ul style="list-style-type: none"> <li>• know the uses, care and maintenance of measuring and marking tools regarding electricity</li> <li>• know the uses, care and maintenance of cutting tools regarding electricity</li> </ul> | <ul style="list-style-type: none"> <li>• describe and apply the uses, care and maintenance of the following measuring and marking tools: <ul style="list-style-type: none"> <li>- ruler</li> <li>- measuring tape</li> <li>- T-chalk</li> <li>- pencil</li> <li>- tester (multimeter)</li> <li>- insulator tester</li> </ul> </li> <li>• describe and apply the uses, care and maintenance of the following cutting tools: <ul style="list-style-type: none"> <li>- wire stripper</li> <li>- hack saw</li> <li>- pliers</li> <li>- reamer</li> <li>- multiplier</li> <li>- stock and dies</li> <li>- hand drills</li> <li>- twist drills</li> <li>- breast drill</li> <li>- chisel</li> <li>- drilling machines</li> </ul> </li> </ul> |

| TOPIC                                                         | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                                                          | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED.....)</b> |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2.2 Tools and equipment<br>(continued)                        | <ul style="list-style-type: none"> <li>• know the uses, care and maintenance of holding tools regarding electricity</li> <li>• know the uses, care and maintenance of driving tools, regarding electricity</li> <li>• know the uses, care and maintenance of wiring tools</li> </ul> | <ul style="list-style-type: none"> <li>• describe and apply the uses, care and maintenance of the following holding tools: <ul style="list-style-type: none"> <li>- draw vice</li> <li>- hand vice</li> <li>- pipe vice</li> <li>- engineer's vice (bench vice)</li> </ul> </li> <li>• describe and apply the uses, care and maintenance of the following driving tools: <ul style="list-style-type: none"> <li>- screwdrivers/insolated screw drivers</li> <li>- rubber mallets</li> <li>- chasing hammer</li> </ul> </li> <li>• identify and apply the uses, care and maintenance of the following wiring tools: <ul style="list-style-type: none"> <li>- soldering wire /soft solder</li> <li>- soldering iron</li> <li>- solder sucker</li> <li>- pipe bender</li> <li>- fish tape</li> <li>- insulated gloves</li> <li>- insulation tape</li> </ul> </li> </ul> |

| TOPIC                                                         | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                  | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED.....)</b> |                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2.3 Electrical terminology                                    | <ul style="list-style-type: none"> <li>• know basic electric concepts</li> <li>• know basic electric concepts (continued)</li> <li>• understand the atomic theory</li> </ul> | <ul style="list-style-type: none"> <li>• identify the following from given circuits and write down their symbols: <ul style="list-style-type: none"> <li>- voltage</li> <li>- current</li> <li>- resistance in a simple direct current (DC) circuit</li> </ul> </li> <li>• apply the following electrical concept: <ul style="list-style-type: none"> <li>- voltage</li> <li>- current</li> <li>- resistance in a simple DC circuit</li> </ul> </li> <li>• explain the composition of an atom</li> </ul>                  |
| 2.4 Cell/batteries                                            | <ul style="list-style-type: none"> <li>• understand cells, their functions and maintenance</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>• illustrate different types of cells</li> <li>• identify and describe the parts of cells</li> <li>• draw and explain a diagrammatic presentation of cell compositions</li> <li>• describe the working principles of: <ul style="list-style-type: none"> <li>- lead–acid</li> <li>- alkaline</li> </ul> </li> <li>• explain the various types and working principles of cells</li> <li>• explain the care and maintenance</li> <li>• explain the safe disposal of cells</li> </ul> |

| TOPIC                                                         | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                            | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED.....)</b> |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2.5 Electrical circuits                                       | <ul style="list-style-type: none"> <li>• know concepts relating to Ohm's law</li> <li>• understand calculations in series and parallel circuits</li> <li>• know how to remove, repair and replace electrical or electronic components/units</li> </ul> | <ul style="list-style-type: none"> <li>• describe Ohm's law relating to: <ul style="list-style-type: none"> <li>- potential difference</li> <li>- current</li> <li>- resistance</li> <li>- electromotive force</li> <li>- power</li> </ul> </li> <li>• apply calculations regarding Ohm's law</li> <li>• perform basic calculations related to series and parallel circuits</li> <li>• perform the following basic operations on electrical components: <ul style="list-style-type: none"> <li>- repair/replace/remove defective parts and components</li> <li>- draw and set up simple electric circuits correctly</li> </ul> </li> </ul>                                                        |
| 2.6 Conductors and insulating materials                       | <ul style="list-style-type: none"> <li>• know the concepts of conductors and insulating materials</li> <li>• know different adapter cords and cables</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>• explain the various types of materials used for: <ul style="list-style-type: none"> <li>- conductors</li> <li>- insulators and</li> <li>- semiconductors</li> </ul> </li> <li>• describe the requirements, properties, uses and colour codes for conductors</li> <li>• construct adapter cords for electrical portable appliances</li> <li>• explain the uses of the following cables: <ul style="list-style-type: none"> <li>- polyvinyl chloride (PVC) cables</li> <li>- paper insulated cables</li> <li>- suffix</li> <li>- cross linked polythene</li> </ul> </li> <li>• list the advantages and disadvantages of the cables listed above</li> </ul> |

| TOPIC                                                         | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                     | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED.....)</b> |                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2.7 Joining electrical components and materials               | <ul style="list-style-type: none"> <li>• know various types of joints</li> </ul>                                                                                                                                                                | <ul style="list-style-type: none"> <li>• apply and illustrate the different types of joints: <ul style="list-style-type: none"> <li>- T-joints</li> <li>- Y-joints</li> <li>- corner joints</li> <li>- cross joints</li> </ul> </li> <li>• apply and demonstrate different joining methods: <ul style="list-style-type: none"> <li>- soldering</li> <li>- screws</li> <li>- brackets</li> <li>- adhesives</li> </ul> </li> </ul>                                                                                                                                                                              |
| 2.8 Magnetism                                                 | <ul style="list-style-type: none"> <li>• understand the molecular theory</li> <li>• know the construction of the single stroke bell circuit</li> <li>• understand the Right Hand Rule</li> <li>• understand Fleming's Left Hand Rule</li> </ul> | <ul style="list-style-type: none"> <li>• describe the molecular theory of magnets</li> <li>• explain why the magnets are classified as natural, permanent and electromagnetism</li> <li>• sketch the following: <ul style="list-style-type: none"> <li>- poles</li> <li>- lines of force</li> <li>- flux density</li> <li>- field strength</li> </ul> </li> <li>• sketch how a magnetic field is established when an electrical current flows through a conductor</li> <li>• describe the effect on the magnetic field around a current carrying conductor when placed in a uniform magnetic field</li> </ul> |

| TOPIC                                                         | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 2: ELECTRICITY AND ELECTRONICS (CONTINUED.....)</b> |                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2.9 Earthing and consumers' circuits                          | <ul style="list-style-type: none"> <li>understand the necessity of earthing</li> </ul>                                     | <ul style="list-style-type: none"> <li>define and describe the meaning of the following terms: <ul style="list-style-type: none"> <li>earthed</li> <li>earth conductor</li> <li>earth continuity conductor</li> <li>earth electrode</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| 2.10 Testing                                                  | <ul style="list-style-type: none"> <li>know how to install power supplies</li> <li>understand the electric test</li> </ul> | <ul style="list-style-type: none"> <li>demonstrate installation of power supplies to: <ul style="list-style-type: none"> <li>outer buildings</li> <li>main buildings</li> </ul> </li> <li>explain the use of the insulation tester for testing installations and electrical apparatus for insulation and earth faults</li> <li>name and explain the following concepts: <ul style="list-style-type: none"> <li>continuity conductors</li> <li>insulation resistance between conductor</li> <li>polarity</li> <li>earth continuity</li> <li>earth leakage protection</li> </ul> </li> </ul> |
| 2.11 Types of currents                                        | <ul style="list-style-type: none"> <li>know the difference between direct and alternating currents</li> </ul>              | <ul style="list-style-type: none"> <li>explain the difference between alternate and direct current circuits</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| TOPIC                                      | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                               | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 3: PLUMBING AND PIPE FITTING</b> |                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 3.1. Safety and housekeeping               | <ul style="list-style-type: none"> <li>• understand the concept of safety and housekeeping</li> <li>• be familiar with the NOSA act</li> <li>• realise the importance of firefighting equipment</li> <li>• understand emergency and evacuation</li> </ul> | <ul style="list-style-type: none"> <li>• describe the concept safety and housekeeping.</li> <li>• explain the importance of safety in the workshop.</li> <li>• describe the manual handling tasks performed in the workplace: <ul style="list-style-type: none"> <li>- stacking</li> <li>- lifting</li> <li>- transporting</li> <li>- carrying</li> </ul> </li> <li>• identify the different types of firefighting equipment found on a worksite</li> <li>• describe the different classes of fire</li> <li>• explain and demonstrate the use of a fire extinguisher</li> <li>• define emergency and evacuation</li> <li>• identify the different types of chemicals used in the plumbing industry: <ul style="list-style-type: none"> <li>- solvents</li> <li>- flux</li> <li>- adhesives</li> <li>- drain clearing acid</li> <li>- PVC glue</li> </ul> </li> <li>• list common injuries and damages caused by chemicals.</li> </ul> |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                       | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3.2 Hand tools                                              | <ul style="list-style-type: none"> <li>• know different categories of hand tools and their uses in plumbing operations</li> <li>• understand how to safely use, maintain and store plumbing hand tools</li> </ul> | <ul style="list-style-type: none"> <li>• classify tools per category: <ul style="list-style-type: none"> <li>- guiding and testing tools</li> <li>- measuring tools</li> <li>- holding tools</li> <li>- fastening tools</li> <li>- bending tools</li> <li>- cleaning tools</li> <li>- cutting tools</li> <li>- marking tools</li> </ul> </li> <li>• identify and explain the uses of the various hand tools</li> <li>• demonstrate the use, maintenance and storage of hand tools</li> <li>• describe the safety precautions applicable to each tool, when in use</li> </ul> |
| 3.3 Machines                                                | <ul style="list-style-type: none"> <li>• know types of machines used in plumbing operation and their uses</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>• identify different types of machines in plumbing operation and explain their uses: <ul style="list-style-type: none"> <li>- guillotine</li> <li>- hand lever shear</li> <li>- universal bending machine</li> <li>- pipe thread cutting machine</li> <li>- rolling machine</li> <li>- box and pan bending machine</li> <li>- grinding machine</li> <li>- drilling machine</li> <li>- swaging and Jenny machine</li> </ul> </li> </ul>                                                                                                |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                     | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3.3 Machines (continued)                                    | <ul style="list-style-type: none"> <li>• know the different parts and components of machines used in plumbing operation</li> <li>• understand the safety precautions of the machines</li> </ul> | <ul style="list-style-type: none"> <li>• describe the different parts and components of the machines used in plumbing: <ul style="list-style-type: none"> <li>- guards</li> <li>- blade/cutting disc</li> <li>- face</li> <li>- motor</li> <li>- base</li> <li>- column</li> </ul> </li> <li>• explain the safe usage and care of the above-mentioned machines</li> <li>• describe the safety precautions applicable to each machine</li> </ul>                                                                                                                                                     |
| 3.4 Metal and non-metal materials                           | <ul style="list-style-type: none"> <li>• understand metal concept “alloys”</li> <li>• understand the safe use of materials</li> </ul>                                                           | <ul style="list-style-type: none"> <li>• define the term alloy</li> <li>• list the examples of alloy metals: <ul style="list-style-type: none"> <li>- bronze</li> <li>- brass</li> <li>- galvanized mild steel</li> </ul> </li> <li>• state the control measures when handling different materials: <ul style="list-style-type: none"> <li>- PPE (Personal Protective Equipment)</li> <li>- training and education</li> <li>- elimination</li> <li>- enclosure or isolation</li> <li>- engineering methods</li> <li>- safe work practices</li> <li>- administrative controls</li> </ul> </li> </ul> |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                                                                                                            | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3.5 Soldering and welding                                   | <ul style="list-style-type: none"> <li>understand soft and hard soldering</li> </ul>                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>define the terms soft and hard soldering</li> <li>distinguish between soft and hard soldering</li> <li>describe soft and hard soldering regarding: <ul style="list-style-type: none"> <li>tinning of a soldering iron</li> <li>reasons for using fluxes</li> <li>soldering medium (soldering stick or wire) and fluxes used</li> </ul> </li> <li>explain the safety precautions related to soft and hard soldering</li> <li>describe the procedure for soft soldering</li> <li>apply the procedure for soft soldering by means of demonstration of the soldering techniques</li> </ul>                                  |
| 3.6 Cold water supply                                       | <ul style="list-style-type: none"> <li>understand the law of supplying cold water</li> <li>know plumbing terminology for cold water supply</li> <li>know the difference of water hardness and its effect on pipe work</li> <li>understand the process of water purification</li> </ul> | <ul style="list-style-type: none"> <li>explain the by-laws, required in cold water supply: <ul style="list-style-type: none"> <li>prevention of contamination</li> <li>prevention of waste</li> <li>prevention of misuse</li> <li>prevention of undue consumption</li> </ul> </li> <li>explain the following terms: <ul style="list-style-type: none"> <li>potable water, volume and relative density</li> <li>water cycle and water hammer</li> </ul> </li> <li>describe the difference between hard and soft water</li> <li>name and explain two types of water hardness</li> <li>list and describe the four main processes of water purification</li> </ul> |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                                            | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3.6 Cold water supply<br>(continued)                        | <ul style="list-style-type: none"> <li>• know taps and valves</li> <li>• know the functions of the different taps and valves used in plumbing</li> <li>• understand frost damage protection</li> </ul> | <ul style="list-style-type: none"> <li>• mention two ways in which taps are classified: <ul style="list-style-type: none"> <li>- screw down taps</li> <li>- quarter turn taps</li> </ul> </li> <li>• distinguish between screw down and quarter turn</li> <li>• classify different types of screw down taps: <ul style="list-style-type: none"> <li>- bib tap</li> <li>- pillar taps</li> <li>- stop valve (stop cock)</li> <li>- gate valve</li> <li>- drain off cock and mixer tap</li> </ul> </li> <li>• classify different types of quarter turn taps: <ul style="list-style-type: none"> <li>- plug taps</li> <li>- ball cock (valve)</li> <li>- ceramic disk taps and non-concussive taps</li> </ul> </li> <li>• identify different taps and valve components on a drawing</li> <li>• describe the working principles of taps and valves used for domestic hot and cold water supply</li> <li>• describe the method used to protect plumbing installations from frost damage</li> </ul> |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                                 | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3.7 Hot water supply                                        | <ul style="list-style-type: none"> <li>be familiar with the installation of domestic hot water supply</li> <li>know how to draw different types of heating units</li> </ul> | <ul style="list-style-type: none"> <li>define the term “installation”</li> <li>identify the components of a heating unit: <ul style="list-style-type: none"> <li>pressure control valve</li> <li>pressure relief valve</li> <li>safety valve</li> <li>drain cock</li> <li>vacuum breakers</li> <li>heating element</li> <li>thermostat</li> </ul> </li> <li>name different types of heat units: <ul style="list-style-type: none"> <li>electrical water heater</li> <li>boiler and cylinder supply system</li> <li>combination electric geyser</li> <li>high pressure geyser</li> </ul> </li> </ul> |
| 3.8 Drainage                                                | <ul style="list-style-type: none"> <li>understand drainage and the drawing of a drainage layout</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>sketch with notes to show the drainage layout and working principles of the following: <ul style="list-style-type: none"> <li>ventilation</li> <li>anti-siphon pipes</li> <li>gully</li> <li>manhole</li> <li>inspection chamber</li> <li>inspection eye</li> <li>rodding eye</li> <li>ramp</li> </ul> </li> </ul>                                                                                                                                                                                                                                           |

| TOPIC                                                       | GENERAL OBJECTIVES<br><i>Learners will:</i>                                                                                                                         | GRADE 9 SPECIFIC OBJECTIVES<br><i>Learners should be able to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MODULE 3: PLUMBING AND PIPE FITTING (CONTINUED.....)</b> |                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3.8 Drainage (continued)                                    | <ul style="list-style-type: none"> <li>• know sanitary pipe systems</li> <li>• know sanitary fitments</li> </ul>                                                    | <ul style="list-style-type: none"> <li>• describe and explain, with the aid of diagrams, the sanitary pipe arrangement for the following pipe systems: <ul style="list-style-type: none"> <li>- single stack</li> <li>- stub stack</li> </ul> </li> <li>• describe, with the aid of drawings, the function and working principles of the sanitary fitments: <ul style="list-style-type: none"> <li>- cistern</li> <li>- flush valve</li> <li>- trap</li> <li>- grease/sand-trap</li> <li>- stable-gully</li> <li>- petrol interceptor</li> </ul> </li> </ul>                                        |
| 3.9 Sheet Metalwork                                         | <ul style="list-style-type: none"> <li>• understand different types of joints used in sheet metalwork</li> <li>• realise pattern developments</li> </ul>            | <ul style="list-style-type: none"> <li>• list the types of joints used in sheet metalwork: <ul style="list-style-type: none"> <li>- grooved joints</li> <li>- lap joints</li> <li>- pop rivet joints</li> <li>- solder joints</li> </ul> </li> <li>• draw and identify from given drawings, the different types of joints</li> <li>• draw, to a given scale, sheet metal pattern developments of the following: <ul style="list-style-type: none"> <li>- pipes (square, rectangular, cylindrical and oblique)</li> <li>- pyramids</li> <li>- cones (cylindrical and oblique)</li> </ul> </li> </ul> |
| 3.10 Calculations                                           | <ul style="list-style-type: none"> <li>• know how to use different formulae for needed calculations</li> <li>• understand the calculation of percentages</li> </ul> | <ul style="list-style-type: none"> <li>• calculate the circumference, areas and the volumes of different objects</li> <li>• calculate percentages</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## **10. ASSESSMENT**

A learner-centred curriculum and learner-centred teaching encompass a broad range of knowledge and skills which are relevant to the knowledge-based society. The specific objectives in the syllabus state what understanding and skills a learner must demonstrate as a result of this teaching-learning process, and which objectives will be assessed. However, it is intended that the curriculum should focus on learning, not on assessment and examination. Assessment and examination are only to support learning.

### **10.1 Types and methods of assessment**

#### ***Continuous assessment***

In order to capture the full range and levels of competence, a variety of formal and informal continuous assessment situations are needed to give a complete picture of the learner's progress and achievements in all subjects. Continuous assessment must be clear, simple and manageable, and explicitly anchored in learner-centred principles and practice. Teachers must provide a reliable and valid assessment of the learner's performance in the specific objectives. The information gathered about the learners' progress and achievements should be used to give feedback to the learners about their strong and weak points, i.e. where they are doing well, and why, and where, how and why they need to improve. The parents should be informed regularly about the progress of their children in all subjects, be encouraged to acknowledge achievements, and given suggestions as to how they can support the child's learning activities. The learner's progress and achievements in this subject must be reported to parents in the school report.

#### ***Informal and formal methods***

The teacher must assess how well each learner is mastering the specific objectives described in the syllabus and from this gain a picture of the all-round progress of the learner. To a large extent, this can be done in an informal way and in their participation in general, through structured observation of each learner's progress in learning and practice situations while they are investigating things, interpreting phenomena and data, applying knowledge, communicating and making value judgements.

When it is necessary to structure assessment more formally, the teacher should as far as possible use situations similar to ordinary learning and practice situations to assess the competency of the learner. Formal written and oral tests can be used to assess only a limited range of specific objectives and therefore should not take up a great deal of time. Short tests should be limited to part of a lesson and only in exceptional cases use up a whole lesson.

#### ***Formative and summative assessment***

The two modes of assessment used are formative continuous assessment and summative assessment. Formative continuous assessment is any assessment made during the school year in order to improve learning and to help shape and direct the teaching-learning process. Assessment has a formative role for learners if and when:

- it is used to motivate them to extend their knowledge and skills, establish sound values, and to promote healthy habits of study
- assessment tasks help learners to solve problems intelligently by using what they have learnt
- the teacher uses the information to improve teaching methods and learning materials

Summative assessment is an assessment made at the end of the school year based on the accumulated total of the progress and achievements of the learner throughout the year in a given subject, together with any end-of-year tests or examinations. The result of summative assessment is a single end-of-year promotion grade.

## Evaluation

Information from informal and formal continuous assessment is to be used by the teacher to ascertain where it is necessary to adapt methods and material to the individual progress and needs of each learner. At the end of each main unit of teaching and at the end of each term, the teacher, together with the learners, should evaluate the learning-teaching process in terms of tasks completed, participation, what the learners have learnt, and what can be done to improve the working atmosphere in and achievements of the class.

### Criterion-referenced grades

When grades are awarded in continuous assessment, it is essential that they reflect the learner's actual level of achievement in the specific objectives, and are not related to how well other learners are achieving these objectives or to the idea that a fixed percentage of the learners must always be awarded a Grade A, B, C, and so on (norm-referencing). In criterion-referenced assessment, each letter grade must have a descriptor for what the learner must demonstrate in order to be awarded the grade. Grade descriptors must be developed for each subject for each year. It is important that teachers in each department/section work together to have a shared understanding of what the grade descriptors mean, and how to apply them in continuous assessment, so that grades are awarded correctly and consistently across subjects. Only then will the assessment results be reliable.

### 10.2 Grade descriptors

The learner's summative achievement in the specific objectives will be shown in letter grades A to E, where A is the highest and E the lowest grade for learners achieving minimum competency level. In cases where a learner has not reached the minimum level of competency a U will be awarded. When letter grades are awarded, it is essential that they reflect the learner's actual level of achievement in relation to the specific objectives. The relation between the letter grades and specific objectives is shown in the table below.

| Grade | % Range | Grade descriptions                                                                                                                                                                                                                                                                        |
|-------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A     | 80%+    | <b>Achieved objectives exceptionally well.</b> The learner is outstanding in all areas of competency.                                                                                                                                                                                     |
| B     | 70-79%  | <b>Achieved objectives very well.</b> The learner's achievement lies substantially above average requirements and the learner is highly proficient in most areas of competency.                                                                                                           |
| C     | 60-69%  | <b>Achieved objectives well.</b> The learner has mastered the specific objectives and can apply them in unknown situations and contexts.                                                                                                                                                  |
| D     | 50-59%  | <b>Achieved objectives satisfactorily.</b> The learner's achievement corresponds to average requirements. The learner may be in need of learning support in some areas.                                                                                                                   |
| E     | 40-49%  | <b>Achieved the minimum number of objectives to be considered competent.</b> The learner may not have achieved all the specific objectives, but the learner's achievement is sufficient to exceed the minimum competency level. The learner is in need of learning support in most areas. |
| U     | 0-39%   | <b>Ungraded.</b> The learner has not been able to reach a minimum level of competency in the objectives, even with extensive help from the teacher. The learner is seriously in need of learning support.                                                                                 |

### 10.3 Assessment objectives

The assessment objectives for Technical Studies C are:

#### ***Assessment objective A: Knowledge with understanding***

Learners should be able to:

- demonstrate the ability to state facts, recall and name items, recall and describe processes
- demonstrate the ability to apply and relate knowledge to basic design and manufacturing
- make reasoned arguments and anticipate consequences about outcomes of the design and realisation process
- demonstrate a crucial awareness of the interrelationship between design and the needs of society.

#### ***Assessment objective B: Design problem solving***

Learners should be able to:

- identify clearly, from a situation, a specific need for which a solution is required and compose a design brief;
- analyse a problem by considering any relevant functional, aesthetic, human, economic and environmental design issues and draw up a design specification;
- generate a range of outline solutions to a design problem, giving consideration to the constraints of time, skills and resources;
- test and refine the functional and aesthetic effectiveness of design solutions.

#### ***Assessment objective C: Design communication***

Learners should be able to:

- recognise information in one form and where necessary change it into a more applicable form;
- propose and communicate ideas graphically;
- develop ideas and represent details of form, shape, constructive movement, size and structure through graphical presentation.

#### ***Assessment objective D: Realisation***

Learners should be able to:

- plan and organise the work procedure involved in the realisation of a solution;
- select, from a range of resources, those appropriate for the realisation of the product;
- demonstrate appropriate manipulative skills by showing an understanding of materials and their characteristics in relation to their use;
- demonstrate appropriate manipulative skills by showing the ability to correctly and efficiently use instruments and tools used in the realisation of a product.

### 10.4 Continuous assessment: detailed guidelines

A specified number of continuous assessment activities per term should be selected, graded and recorded. Not more than three assessments per term are to be topic tests. These continuous assessments must be carefully planned and marked according to a marking scheme, marking criteria or memorandum. The criteria used to assess activities other than tests should be given to the learner before the assessment activity. Evidence of the work produced by good, average and low-achieving learners, as well as the written assignment and marking scheme, has to be kept at school until the end of the next year. Teachers can choose to grade and/or record

more than the required continuous assessments if it is necessary for formative purposes. An end-of-year summative grade will be based only on the assessment tasks described in the syllabus. Not more than 40% of the continuous assessment may be based on tests, which include topic tests and end-of-term tests.

### Types of continuous assessment tasks

In Technical Studies C in the Junior Secondary phase the continuous assessment tasks are as follows:

**Observations/reports/worksheets or topic tasks:** These are activities that most teachers already use in their day-to-day teaching. These are recorded, assessed activities that could introduce a topic, be used during the teaching of a topic and /or revision of a topic. They may well include assessment involving specific objectives to do with locating information, conducting surveys, analysing information or presenting information. This will involve assessments of specific objectives in all assessment objectives; however, not all assessment objectives need to be present in every topic task.

**Practicals:** These are assessments of practical skills done during a practical activity where learners are required to plan and to carry out investigations and to collect, report and analyse information. After each topic, a practical exercise should be conducted to evaluate learners' skills.

**Topic tests:** Completed topics should be concluded with a test indicating the achievements of the learners in these topics.

**End-of-term test:** This will be a more comprehensive topic test of the term's work. Teaching should continue, but no homework should be assigned during the time of writing the end-of-term tests.

### Summary of continuous assessment tasks

| Continuous assessment Grade 8      |                |                  |                |                  |                |       |
|------------------------------------|----------------|------------------|----------------|------------------|----------------|-------|
|                                    | Term 1         |                  | Term 2         |                  | Term 3         |       |
| Components                         | Number & marks | Total            | Number & marks | Total            | Number & marks | Total |
| Observations/reports/worksheets    | 3×20           | 60               | 3×20           | 60               | 3×20           | 60    |
| Practical                          | 3×30           | 90               | 3×30           | 90               | 3×30           | 90    |
| Topic tests                        | 3×20           | 60               | 3×20           | 60               | 3×20           | 60    |
| End-of-term tests                  | 100÷2          | 50               | 100÷2          | 50               |                |       |
| Term marks                         |                | 260              |                | 260              |                | 210   |
| Weighted term marks (report marks) |                | (260÷2.6)<br>100 |                | (260÷2.6)<br>100 |                |       |

| Continuous assessment Grade 9               |                |                  |                |                  |                |       |
|---------------------------------------------|----------------|------------------|----------------|------------------|----------------|-------|
|                                             | Term 1         |                  | Term 2         |                  | Term 3         |       |
| Components                                  | Number & marks | Total            | Number & marks | Total            | Number & marks | Total |
| Observations/reports/worksheets/topic tasks | 3×20           | 60               | 3×20           | 60               | 1×20           | 20    |
| Practicals                                  | 3×30           | 90               | 3×30           | 90               | 1×30           | 30    |
| Topic tests                                 | 3×20           | 60               | 3×20           | 60               | 1×20           | 20    |
| End-of-term tests                           | 100÷2          | 50               | 100÷2          | 50               |                |       |
| Term marks                                  |                | 260              |                | 260              |                | 70    |
| Weighted term marks (report marks)          |                | (260÷2.6)<br>100 |                | (260÷2.6)<br>100 |                |       |

The continuous assessment (CA) marks for one term is converted to a mark out of 100 (weighted term mark). Only this mark should be used for the report at the end of term 1 and term 2. Learners should not write an examination at the end of the first two terms, but only an end-of-term test which is part of the CA and part of the weighted term mark.

### 10.5 End-of-year examinations: detailed guidelines

At the end of Grade 8 and 9 there will be an end-of-year examination. The Grade 9 papers will be set by DNEA/Regions and marked regionally. The purpose of this examination is to focus on how well learners can demonstrate their thinking, communication, and problem-solving skills related to the areas of the syllabus which are most essential for continuing in the next grade. Preparing for and conducting these examinations should not take up more than two weeks altogether right at the end of the year.

The description of the various papers for the written examination is as follows:

| Written examination |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |       |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|
| Grade               | Description of papers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Duration   | Marks |
| 8                   | <p>This paper will consist of <b>three</b> sections:</p> <p><b>Section A:</b><br/>Section A will consist of <b>ten</b> short answer compulsory questions intended to assess knowledge of <b>all three modules</b> (10 marks).</p> <p><b>Section B:</b><br/>Section B will consist of <b>six</b> questions of which a learner will be required to answer <b>one</b> question from <b>each of the three modules</b> (20 marks x 3 = 60 marks).</p> <p><b>Section C:</b><br/>Section C will consist of <b>three</b> structured questions, one from each of the three modules, of which a learner will be required to answer <b>one</b> question (30 marks).</p> | 2 h 30 min | 100   |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |     |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|
| <b>9</b> | <p>This paper will consist of <b>three</b> sections:</p> <p><b>Section A:</b><br/>Section A will consist of <b>ten</b> short answer compulsory questions intended to assess knowledge of <b>all three modules</b> (10 marks).</p> <p><b>Section B:</b><br/>Section B will consist of <b>six</b> questions of which a learner will be required to answer <b>one</b> question from <b>each of the three modules</b> (20 marks x 3 = 60 marks).</p> <p><b>Section C:</b><br/>Section C will consist of <b>three</b> structured questions, one from each of the three modules of which a learner will be required to answer <b>one</b> question (30 marks).</p> | 2 h 30 min | 100 |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|

### Promotion marks

For Technical Studies C in Grades 8 & 9 continuous assessment contributes 50% to the promotion mark and the end-of-year examination contributes 50%. The weighting of each assessment component is as follows:

| Component                    | Description                                                              | Marks          | Weighting |
|------------------------------|--------------------------------------------------------------------------|----------------|-----------|
| <b>Written examination</b>   | Section A:<br>Section B:<br>Section C:                                   | 10<br>60<br>30 | 50%       |
| <b>Continuous assessment</b> | Observation/report/work sheets, practical, topic tests, end-of-term test | 100            | 50%       |
| <b>Total marks</b>           |                                                                          | 200            | 100%      |

The promotion marks are calculated as follows:

| Promotion mark Grade 8         |                                                    |        |        |       |
|--------------------------------|----------------------------------------------------|--------|--------|-------|
|                                | Term 1                                             | Term 2 | Term 3 | Total |
| <b>Term mark</b>               | 210                                                | 210    | 210    | 630   |
| <b>CA mark</b>                 | (630÷6.3)                                          |        |        | 100   |
| <b>End-of-year examination</b> |                                                    |        |        | 100   |
| <b>Promotion mark</b>          | (CA mark + end-of-year examination) ÷ 2<br>(200÷2) |        |        | 100   |

| Promotion mark Grade 9         |                                                    |        |        |       |
|--------------------------------|----------------------------------------------------|--------|--------|-------|
|                                | Term 1                                             | Term 2 | Term 3 | Total |
| <b>Term mark</b>               | 210                                                | 210    | 70     | 490   |
| <b>CA mark</b>                 | (490÷4.9)                                          |        |        | 100   |
| <b>End-of-year examination</b> |                                                    |        |        | 100   |
| <b>Promotion mark</b>          | (CA mark + end-of-year examination) ÷ 2<br>(200÷2) |        |        | 100   |

## 10.6 Specification grid

The Specification grid below indicates the weighting allocated to each objective for both continuous assessment and for the written examination.

| Components                                             | Weighting | Total (marks) |
|--------------------------------------------------------|-----------|---------------|
| <b>Assessment objectives for written examination</b>   |           |               |
| <b>Objective A</b> Knowledge with understanding        | 40%       | 40            |
| <b>Objective B</b> Design problem solving              | 16%       | 16            |
| <b>Objective C</b> Design communication                | 22%       | 22            |
| <b>Objective D</b> Realisation                         | 22%       | 22            |
| <b>Assessment objectives for continuous assessment</b> |           |               |
| <b>Objective A</b> Knowledge with understanding        | 16%       | 16            |
| <b>Objective B</b> Design problem solving              | 42%       | 42            |
| <b>Objective C</b> Design communication                | 16%       | 16            |
| <b>Objective D</b> Realisation                         | 26%       | 26            |

## ANNEXE 1: GLOSSARY OF TERMS

|                                  |                                                                                                                                                                             |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>aesthetics</b>                | how something looks, especially when considering how pleasing it is                                                                                                         |
| <b>analyse</b>                   | examine information in detail to discover patterns or relationships                                                                                                         |
| <b>axonometric</b>               | used to describe a method of drawing a 3-dimensional object so that the vertical and horizontal axes are drawn to scale but the curves and diagonals appear distorted       |
| <b>CAD</b>                       | Computer Aided Drafting, used to make sketches with the help of a computer e.g. building plans                                                                              |
| <b>CAM</b>                       | Computer Aided Manufacturing, used where instructions for manufacturing is given via a computer                                                                             |
| <b>classify</b>                  | to assign things or people to classes or groups                                                                                                                             |
| <b>communication (graphical)</b> | the exchange of information between individuals, by means of speaking or using a system of signs or behaviour (drawing)                                                     |
| <b>DC circuit</b>                | A Direct Current circuit is a circuit where electric current flows through in one direction                                                                                 |
| <b>ergonomics</b>                | the study of how a workplace and the equipment used there can best be designed for comfort, safety, efficiency and productivity                                             |
| <b>evaluate</b>                  | use the information provided to make a judgement about something                                                                                                            |
| <b>media</b>                     | the various means of mass communication thought of as a whole, including radio, television, magazines and newspapers, together with the people involved in their production |
| <b>NOSA</b>                      | National Occupational Safety Association which set safety standards for industry                                                                                            |
| <b>Ohm's law</b>                 | a law stating that electric current is proportional to voltage and inversely proportional to resistance                                                                     |
| <b>pictorial</b>                 | containing illustrations or photographs as opposed to written text (3-D sketches)                                                                                           |
| <b>scale</b>                     | a ratio representing the size of an illustration or reproduction, especially a map or a model, in relation to the object it represents                                      |
| <b>sketch</b>                    | in case of diagrams, make a simple, freehand drawing and in graph work, the shape and/or position of the curve should be given                                              |
| <b>specification</b>             | a detailed description of a particular thing, especially one detailed enough to provide somebody with the information needed to make that thing                             |

|                        |                                                                                      |
|------------------------|--------------------------------------------------------------------------------------|
| <b>technology</b>      | scientific knowledge used in practical ways in industry                              |
| <b>time management</b> | to plan and execute a task within a given period                                     |
| <b>wasting</b>         | misuse / use to no purpose / extravagant or ineffective use of an asset or materials |

## ANNEXE 2: LIST OF TOOLS, EQUIPMENT AND MATERIALS

### Bricklaying and Plastering

#### Setting out tools

- steel ruler
- steel square
- tape measure
- building line

#### Bricklaying tools

- trowel
- spirit level
- builders bucket
- spade/ shovel
- jointer
- gauge rod

#### Cutting tools

- club hammer
- bolster
- comb hammer
- cold chisel

#### Digging tools

- mattock
- pick
- shovel
- spade

#### Plastering tools

- plastering trowel
- wooden float
- hawk
- corner tools

### Plumbing and Pipe Fitting

- steel ruler
- folding ruler
- tape measure
- try square
- files and rasps
- saws
- hammers
- boring tools
- screwdrivers
- pincers
- pipe benders
- thread cutters
- mig welder
- pipe cutters
- telescopes
- grinders
- drills
- portable packs

### Electricity and Electronics

- oscilloscopes
- multi meters
- tong tester
- bench grinder
- transistor, bipolar, power, BD 138
- transistor, bipolar, NPN, BC109
- diode, small-signal, DO35, 1N4148, 20pcs
- capacitor, electrolytic, axial, wire ended, 85degC, +- 20%, 450Vdc, 10uF
- potentiometer, cermet, 12 mm, 1.0W, 149, lin, 500R
- resistor, carbon film, high stab, 2W, 5%, 10R
- resistor, carbon film, high stab, 2W, 5%, 1k5
- switch, toggle, std, panel, 1A, DPCO
- switch, pushbutton assembly, V3 micro, 2 pole, plain
- relay, plug-in, power, 16A, 12Vdc, SPCO, with LED
- electric LAB 700

### ANNEXE 3: ASSESSMENT RECORD SHEET FOR GRADE 8

Assessment record sheet: Technical Studies C      Grade 8: .....      Year: .....

School: .....      Teacher: .....

| Name of Learner | Term | Observations/<br>Reports/<br>Worksheets |    |    | Practicals |    |    | Topic tests |    |    | CA Marks | End-of-term test | Term mark (CA +<br>end of term test) | Weighted term<br>mark (260÷2.6) | Total of CA<br>marks | CA mark<br>(630÷6.3) | End-of-year<br>examination | (CA +<br>Examination) | Promotion mark<br>(200÷2) |
|-----------------|------|-----------------------------------------|----|----|------------|----|----|-------------|----|----|----------|------------------|--------------------------------------|---------------------------------|----------------------|----------------------|----------------------------|-----------------------|---------------------------|
|                 |      | 20                                      | 20 | 20 | 30         | 30 | 30 | 20          | 20 | 20 | 210      | 50               | 260                                  | 100                             | 630                  | 100                  | 100                        | 200                   | 100                       |
|                 | 1    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 2    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 3    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 1    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 2    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 3    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 1    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 2    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 3    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 1    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 2    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 3    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 1    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 2    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |
|                 | 3    |                                         |    |    |            |    |    |             |    |    |          |                  |                                      |                                 |                      |                      |                            |                       |                           |

**Term 1**  
 Moderator: ..... Rank: .....  
 Signature: ..... Date: .....

**Term 2**  
 Moderator: ..... Rank: .....  
 Signature: ..... Date: .....

**Term 3**  
 Moderator: ..... Rank: .....  
 Signature: ..... Date: .....

# ANNEXE 4: ASSESSMENT RECORD SHEET FOR GRADE 9

| Assessment record sheet: Technical Studies C |      |                                     |    |    |            |    |    |             |    |    |          | Grade 9: ..... |                  |                                   |                              | Year: .....    |                   |                         |                    |                        |
|----------------------------------------------|------|-------------------------------------|----|----|------------|----|----|-------------|----|----|----------|----------------|------------------|-----------------------------------|------------------------------|----------------|-------------------|-------------------------|--------------------|------------------------|
| School: .....                                |      |                                     |    |    |            |    |    |             |    |    |          | Teacher: ..... |                  |                                   |                              |                |                   |                         |                    |                        |
| Name of Learner                              | Term | Observations / Reports / Worksheets |    |    | Practicals |    |    | Topic tests |    |    | CA marks |                | End-of-term test | Term mark (CA + end of term test) | Weighted term mark (260÷2.6) | Total CA marks | CA mark (490÷4.9) | End-of-year examination | (CA + Examination) | Promotion mark (200÷2) |
|                                              |      | 20                                  | 20 | 20 | 30         | 30 | 30 | 20          | 20 | 20 | 210      | 70             | 50               | 260                               | 100                          | 490            | 100               | 100                     | 200                | 100                    |
|                                              | 1    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 2    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 3    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 1    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 2    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 3    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 1    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 2    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 3    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 1    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 2    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 3    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 1    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 2    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 3    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 1    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 2    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |
|                                              | 3    |                                     |    |    |            |    |    |             |    |    |          |                |                  |                                   |                              |                |                   |                         |                    |                        |

**Term 1**  
 Moderator: ..... Rank: .....  
 Signature: ..... Date: .....

**Term 2**  
 Moderator: ..... Rank: .....  
 Signature: ..... Date: .....

**Term 3**  
 Moderator: ..... Rank: .....  
 Signature: ..... Date: .....



**The National Institute for Educational Development**

P/Bag 2034

Okahandja

NAMIBIA

**Telephone:** +264 62 509000

**Facsimile:** +264 62 509073

**E-mail:** [info@nied.edu.na](mailto:info@nied.edu.na)

**Website:** <http://www.nied.edu.na>