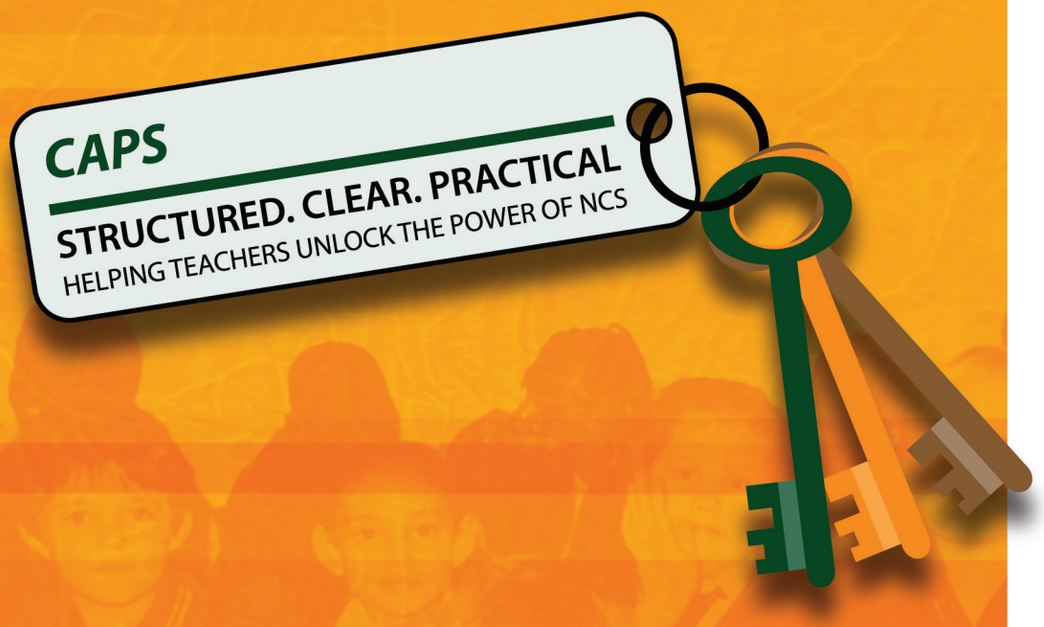
CIVIL TECHNOLOGY

National Curriculum Statement (NCS)

Curriculum Assessment Policy Statement



GRADES 10 – 12

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

CURRICULUM AND ASSESSMENT POLICY STATEMENT (CAPS) GRADES 10 – 12

CIVIL TECHNOLOGY

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FOREWORD BY THE MINISTER

Our national curriculum is the culmination of our efforts over a period of seventeen years to transform the curriculum bequeathed to us by apartheid. From the start of democracy we have built our curriculum on the values that inspired our Constitution (Act 108 of 1996). The Preamble to the Constitution states that the aims of the Constitution are to:

- heal the divisions of the past and establish a society based on democratic values, social justice and fundamental human rights;
- improve the quality of life of all citizens and free the potential of each person;
- lay the foundations for a democratic and open society in which government is based on the will of the people and every citizen is equally protected by law; and
- build a united and democratic South Africa able to take its rightful place as a sovereign state in the family of nations.

Education and the curriculum have an important role to play in realising these aims.

In 1997 we introduced outcomes-based education to overcome the curricular divisions of the past, but the experience of implementation prompted a review in 2000. This led to the first curriculum revision: the *Revised National Curriculum Statement Grades R-9* and the *National Curriculum Statement Grades 10-12* (2002).

Ongoing implementation challenges resulted in another review in 2009 and we revised the *Revised National Curriculum Statement* (2002) to produce this document.

From 2012 the two 2002 curricula, for *Grades R-9* and *Grades 10-12* respectively, are combined in a single document and will simply be known as the *National Curriculum Statement Grades R-12.* The *National Curriculum Statement for Grades R-12* builds on the previous curriculum but also updates it and aims to provide clearer specification of what is to be taught and learnt on a term-by-term basis.

The *National Curriculum Statement Grades R-12* accordingly replaces the Subject Statements, Learning Programme Guidelines and Subject Assessment Guidelines with the

(a) Curriculum and Assessment Policy Statements (CAPS) for all approved subjects listed in this document;

(b) *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R – 12*; and

(c) *National Protocol for Assessment Grades R – 12.*

MRS ANGIE MOTSHEKGA, MP

MINISTER OF BASIC EDUCATION

CONTENTS

SECTION 1

NATIONAL CURRICULUM AND ASSESSMENT POLICY STATEMENT FOR CIVIL TECHNOLOGY IN THE FURTHER EDUCATION AND TRAINING PHASE (GRADES 10 – 12)

1.1 Background

The *National Curriculum Statement Grades R – 12 (NCS)* stipulates policy on curriculum and assessment in the schooling sector.

To improve its implementation, the National Curriculum Statement was amended, with the amendments coming into effect in January 2012. A single comprehensive National Curriculum and Assessment Policy Statement was developed for each subject to replace the old Subject Statements, Learning Programme Guidelines and Subject Assessment Guidelines in Grades R – 12.

The amended *National Curriculum and Assessment Policy Statements (January 2012) replace the National Curriculum Statements Grades R – 9 (2002) and the National Curriculum Statements Grades 10 – 12 (2004)*.

1.2 Overview

(a) The *National Curriculum Statement Grades R – 12 (January 2012)* represents a policy statement for learning and teaching in South African schools and comprises the following:

National Curriculum and Assessment Policy Statements for each approved school subject as listed in the policy document, *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R – 12*, which replaces the following policy documents:

(i) *National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF);* and

(ii) *An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding learners with special needs,* published in the *Government Gazette, No.29466* of 11 December 2006.

(b) The *National Curriculum Statement Grades R – 12 (January 2012)* should be read in conjunction with the *National Protocol for Assessment Grades R – 12*, which replaces the policy document, *An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding the National Protocol for Assessment Grades R – 12*, published in the *Government Gazette, No. 29467* of 11 December 2006.

(c) The Subject Statements, Learning Programme Guidelines and Subject Assessment Guidelines for Grades R – 9 and Grades 10 – 12 are repealed and replaced by the *National Curriculum and Assessment Policy Statements for Grades R – 12 (January 2012)*.

(d) The sections on the Curriculum and Assessment Policy as outlined in Chapters 2, 3 and 4 of this document constitute the norms and standards of the *National Curriculum Statement Grades R – 12* and therefore, in terms of *section 6A* of the *South African Schools Act, 1996 (Act No. 84 of 1996)* form the basis for the Minister of Basic Education to determine minimum outcomes and standards, as well as the processes and procedures for the assessment of learner achievement to be applicable to public and independent schools.

1.3 General Aims of the South African Curriculum

(a) The *National Curriculum Statement Grades R – 12* gives expression to what is regarded to be knowledge, skills and values worth learning. It will ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives. In this regard, the curriculum promotes the idea of grounding knowledge in local contexts, while being sensitive to global imperatives.

(b) The *National Curriculum Statement Grades R – 12* serves the purposes of:

- equipping learners, irrespective of their socio-economic background, race, gender, physical ability or intellectual ability, with the knowledge, skills and values necessary for self-fulfilment and meaningful participation in society as citizens of a free country;
- providing access to higher education;
- facilitating the transition of learners from education institutions to the workplace; and
- providing employers with a sufficient profile of a learner's competences.

(c) The *National Curriculum Statement Grades R – 12* is based on the following principles:

- *Social transformation*: ensuring that the educational imbalances of the past are redressed, and that equal educational opportunities are provided for all sections of the population;
- *Active and critical learning*: encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths;
- *High knowledge and high skills*: the minimum standards of knowledge and skills to be achieved at each grade are specified and set high, achievable standards in all subjects;
- *Progression*: the content and context of each grade show progression from simple to complex;
- *Human rights, inclusivity, environmental and social justice*: infusing the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa. The National Curriculum Statement Grades 10 – 12 (General) is sensitive to issues of diversity such as poverty, inequality, race, gender, language, age, disability and other factors;
- *Valuing indigenous knowledge systems*: acknowledging the rich history and heritage of this country as important contributors to nurturing the values contained in the Constitution; and
- *Credibility, quality and efficiency*: providing an education that is comparable in quality, breadth and depth to those of other countries.

(d) The *National Curriculum Statement Grades R – 12* aims to produce learners who are able to:

- identify and solve problems and make decisions using critical and creative thinking;
- work effectively as individuals and with others as members of a team;
- organise and manage themselves and their activities responsibly and effectively;
- collect, analyse, organise and critically evaluate information;
- communicate effectively using visual, symbolic and/or language skills in various modes;
- use science and technology effectively and critically, showing responsibility towards the environment and the health of others; and
- demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.

(e) Inclusivity should become a central part of the organisation, planning and teaching at each school. This can only happen if all teachers have a sound understanding of how to recognise and address barriers to learning, and how to plan for diversity.

The key to managing inclusivity is ensuring that barriers are identified and addressed by all the relevant support structures within the school community, including teachers, district-based support teams, institutional-level support teams, parents and special schools as resource centres. To address barriers in the classroom, teachers should use various curriculum differentiation strategies such as those included in the Department of Basic Education's *Guidelines for Inclusive Teaching and Learning* (2010).

1.4 Time Allocation

1.4.1 Foundation Phase

(a) The instructional time for subjects in the Foundation Phase is as indicated in the table below:

Subject	Time allocation per week (hours)
I. Languages (FAL and HL)	10 (11)
II. Mathematics	7
III. Life Skills	6 (7)
• Beginning Knowledge	1 (2)
• Creative Arts	2
• Physical Education	2
• Personal and Social Well-being	1

(b) Instructional time for Grades R, 1 and 2 is 23 hours and for Grade 3 is 25 hours.

(c) In languages, 10 hours are allocated in Grades R – 2 and 11 hours in Grade 3. A maximum of eight hours and a minimum of seven hours are allocated for Home Language and a minimum of two hours and a maximum of three hours for Additional Language in Grades R – 2. In Grade 3 a maximum of eight hours and a minimum of seven hours are allocated for Home Language and a minimum of three hours and a maximum of four hours for First Additional Language.

(d) In Life Skills, Beginning Knowledge is allocated one hour in Grades R – 2 and two hours, as indicated by the hours in brackets, in Grade 3.

1.4.2 Intermediate Phase

The table below shows the subjects and instructional times in the Intermediate Phase.

Subject	Time allocation per week (hours)
I. Home Language	6
II. First Additional Language	5
III. Mathematics	6
IV. Science and Technology	3.5
V. Social Sciences	3
VI. Life Skills	4
• Creative Arts	1.5
• Physical Education	1.5
• Religion Studies	1

1.4.3 Senior Phase

The instructional time in the Senior Phase is as follows:

Subject		Time allocation per week (hours)
I.	Home Language	5
II.	First Additional Language	4
III.	Mathematics	4.5
IV.	Natural Sciences	3
V.	Social Sciences	3
VI.	Technology	2
VII.	Economic Management Sciences	2
VIII.	Life Orientation	2
IX.	Arts and Culture	2

1.4.4 Grades 10 - 12

The instructional time in Grades 10 – 12 is as follows:

Subject		Time allocation per week (hours)
I.	Home Language	4.5
II.	First Additional Language	4.5
III.	Mathematics/Technical Mathematics	4.5
IV.	Life Orientation	2
V.	Three Electives	12 (3x4 hr)

The allocated time per week may be used only for the minimum required NCS subjects as specified above, and may not be used for any additional subjects added to the list of minimum subjects. Should a learner wish to pursue additional subjects, additional time must be allocated to offer these subjects.

SECTION 2

CIVIL TECHNOLOGY

2.1 What is Civil Technology?

Civil Technology focuses on concepts and principles in the built environment and on the technological process. It embraces practical skills and the application of scientific principles. This subject aims to create and improve the built environment to enhance the quality of life of the individual and society alike and to ensure the sustainable use of the natural environment. The subject focuses on three main areas, namely:

- Civil services
- Construction
- Woodworking

In the following section, the respective areas of specialisation is described and placed within the intended context.

2.1.1 Civil Services

Civil services can be construed as plumbing, which focuses on the supply of cold and hot water supplies to a building, and the installation of a sewerage system enabling soiled waste water and storm water removal from a site. It focuses on materials and the way they are used to provide water and sanitation on a site, taking into account environmentally friendly technology (green energy). See the content overview for the subject specifics to gain insight of the topics taught.

2.1.2 Construction

Construction focuses on the development of concrete and brick structures in the built environment. It focuses on materials and the way they are used to provide infrastructures in the development of sites, taking into account environmentally friendly technology (green energy). See the content overview for the subject specifics to gain insight of the topics taught.

2.1.3 Woodworking

Woodworking works hand in hand with construction. It focuses on structures such as roof trusses, windows, doors and any part of a building that is made of timber. It also focuses on providing temporary supporting structures to construct permanent structures such as concrete floors, stairs, roofs and arches. See the content overview for the subject specifics to gain insight of the topics taught.

2.2 The table below indicates the main topics in Civil Technology according to the area of specialisation.

CIVIL SERVICES	CONSTRUCTION	WOODWORKING
Safety	Safety	Safety
Materials	Materials	Materials
Equipment	Equipment	Equipment
Graphics and communications	Graphics and communications	Graphics and communications
Terminology	Terminology	Terminology
Quantities	Quantities	Quantities
Joining	Joining	Joining
Construction	Foundations	Casement
Cold water supply	Concrete	Doors
Storm water	Formwork	Wall panelling
Hot water supply	Reinforcements	Centering
Roof work	Cavity walls	Formwork
Drainage (Sewerage)	Lintels	Shoring
Sanitary fitments	Waterproofing	Ironmongery
	Concrete staircases	Suspended timber floors
	Roof coverings	Ceiling
	Brickwork	Staircases
	Piling	Roofs
	Rib and block floors	Cupboards
	Arches	
	Scaffolding	
	Plaster and screed	

2.3 Specific Aims

The aim of the subject Civil Technology is to develop the skills levels of learners from Grades 10 – 12 to such an extent that they will be able to enter a career pathway at a Further Education and Training college or a university immediately after obtaining the National Senior Certificate. Learners will be ready to enter into learnerships or apprenticeships that will prepare them for a trade test.

Through the integrated completion of theoretical work and the practical assessment tasks (PAT), skills in respect of the following will be developed:

- Safe working practices
- Good housekeeping
- First aid practices
- Interpretation of working drawings
- Erection of structures
- Working with accurate measurements
- Workshop practice

Knowledge of subject principles, combined with applied skills, equips the Civil Technology learner with a unique set of skills, placing her or him apart from other learners and in a category much desired by industry, tertiary institutions and entrepreneurs. Learners with Civil Technology as a subject fare markedly better during the first two years at tertiary level when studying engineering than learners without this background, giving them an advantage over their peers.

2.4 Requirements for Civil Technology as a Subject

Schools wishing to offer Civil Technology as a subject to learners should consider the following requirements that should be met in order to successfully implement the subject into the school curriculum.

Civil Technology as a subject allows for three fields of specialisation. Typically a school wishing to offer more than one field of specialisation will have to comply with the following prerequisites:

- Can teachers offer all the chosen areas of specialisation?
- Does the workshop cater for the areas of specialisation?
- Is it possible to cater for different groups within school time-tabling?
- Schools offering more than one field of specialisation are not allowed to mix groups.

2.4.1 Subject offering by learners taking Civil Technology

Learners taking Civil Technology will be required to make a selection from the following choices:

Choice 1	Choice 2
Mathematics	Technical Mathematics
Physical Science	Technical Science
Civil Technology	Civil Technology
Engineering Graphics & Design	Engineering Graphics & Design

Additionally, a learner may opt to take an eighth and ninth subject with these packages. Subjects that could be considered by learners as additional subjects that have a strong linkage with Civil Technology are:

- Computer Applications Technology
- Information Technology

Before this option is exercised at a school the following prerequisites/requirements are brought to the attention of the school management team:

- Availability of resources at the school
- Availability of a teacher to offer the subject outside normal contact time
- Adherence to all assessment requirements in terms of SBA and PAT
- A learner must take the subject from Grade 10 through to 12 and not only in Grade 12

2.4.2 Human Resources

Civil Technology requires a trained subject specialist. It is preferred that the teacher offering Civil Technology is an artisan/technician/technical teacher in a Civil Technology-related area. Industry-related experience and workshop management skills are essential and a tertiary qualification in technical teaching is needed.

Civil Technology teachers are required to:

- Teach the subject content with confidence and flair
- Interact with learners in a relaxed but firm manner
- Manage the workshop resourcing, budget & safety
- Manage the teaching environment
- Conduct stock taking and inventory
- Plan for practical work
- Plan for theory lessons
- Conduct weekly practical sessions
- Maintain and service the workshop as a whole
- Maintain and service the tools and instruments
- Ensure learner safety
- Produce working PAT projects in cooperation with learners
- Carry out School-based Assessment (SBA)
- Implement innovative methods to keep the subject interesting
- Are self-motivated to keep her/him abreast of the latest technological developments
- Regularly attend skills workshops

2.4.3 Equipped Workshop

Civil Technology cannot be implemented in a school without a well-equipped workshop.

Electricity supply to the workshop is crucial and a three phase, four-wire supply is needed.

Lighting and ventilation is of extreme importance and a workshop should ideally have multiple exits with doors that open outward. Windowpanes should be fitted and broken panes should be replaced.

Tools and equipment should have sufficient storage and well developed storage management systems with an up to date inventory. Shelves should be clearly marked and storage areas defined.

Floors should have the needed demarcated markings and all areas should be clearly defined using green, yellow and black paint, in line with industry standards. No carpets or nylon flooring is allowed. Rubber mats should be installed in areas where learners will work with installations that will be energized.

Walls should contain subject related posters and a designated area where learner projects can be exhibited should be clearly visible.

Good housekeeping principles require that all workshops be cleaned regularly. A suitable waste removal system should be in place to accommodate refuse, off-cut materials as well as chemical waste. The requirements of the Occupational Health and Safety (OHS) Act 85 of 1993 need to be complied with at all times.

A workshop assistant for the Civil Technology workshop is required to service the workshop. The purpose of this assistant is to perform preventative maintenance, maintenance, upgrading, service and repair of devices in cooperation with the subject teacher.

The workshop assistant is also required to assist in the safe preparation and completion of practical sessions with regards to issuing equipment and tools, keeping register of all equipment and performing regular inventory stock taking.

An assistant in a Civil Technology workshop will be technically trained depending on the focus of the specialisation at the school. The assistant will also have a sound working knowledge of the OHS Act and workshop related safety.

Instruments, measuring equipment and training equipment should have dust covers to keep them clean.

Tables, workbenches and machinery on stands should be permanently affixed to the floor, with isolation switches for the mains supply. All machines should have working machine guards.

Electrical motors should ideally be painted bright orange. Specification plates should be clearly legible.

The workshop must have a lockable mains distribution board. The workshop must be fitted with an emergency cut-off switch/es which is/are easily accessible at all times. The red, mushroom type, emergency switch should preferably be lockable to prevent accidental re-connection with mains in the case of it being activated.

2.4.4 Sustainable Support

Civil Technology is a subject that requires sustained support. The Civil Technology workshop requires regular resourcing for the purpose of completion of practical work as well as maintenance. Resourcing could be sub-divided into the following categories:

- Safety Equipment
- Tools and Equipment
- Consumable Materials
- PAT Resources
- Teaching and Learning Support Material
- Preventative Maintenance
- Maintenance

School management teams (SMT) at schools offering Civil Technology should take note of the implications that the Civil Technology workshop has on the budget of the school.

Whilst it is common practice to provide a working budget to a workshop, it is imperative to note that the budget should be structured to not only cater for the completion of PAT by the learners, but should also allow for the teacher to replenish tools and equipment, and acquire consumable materials for experiments, demonstrations and simulations.

Apart from the PAT resources needed, the teacher must also be allowed to supplement teaching and learning support material in the form of posters, models, examples, videos, periodicals and more.

Preventative maintenance of training equipment on a regular basis, as well as provisioning for the inevitable failure of equipment, should not be disregarded, and the SMT of a school should have in place a plan to regularly phase out and replace obsolete equipment and tools.

2.4.1 The following requirements are of the utmost importance in the offering of the subject:

1. Each learner should have access to:

- A textbook
- A workshop with tools and equipment
- A variety of civil engineering and building industry magazines and reference books
- Drawing equipment
- A calculator
- Measuring equipment, tools and consumable items for civil technology
- A computer with simulation and CAD software (strongly recommended)

2. The school should subscribe to at least one or two building and civil engineering magazines for the teacher to keep abreast with the latest developments in the built environment. These magazines could also be lent out to learners (in the same way as library books). These resources must be readily available in the classroom or in the library.

3. The teacher should have a variety of reference books, charts and brochures in the classroom to stimulate the learners' interest in the subject.

4. The teacher should have access to the internet to be able to source, download and print relevant and new information, as the built environment is a dynamic industry with new trends and developments. The teacher should also have electronic mail facilities, as new information from subject advisors and other sources need to be downloaded via electronic mail.

5. Subject advisers must provide regular support to the teachers.

2.5 Career Opportunities

Learners taking Civil Technology will opt for one of the following career opportunities:

- apprenticeship to become an artisan
- continued studies at a college in the NC(V) in a vocational career pathway
- higher education at a university of technology
- higher education at a university (to study engineering)
- working as an entrepreneur or working with an entrepreneur or
- higher education to study technical education in order to become a teacher of technology

Career and occupational opportunities for learners with a foundation in Civil Technology include, but are not limited to:

- carpenter and joiner
- bricklayer
- tiler
- painter
- plumber
- drainlayer
- roof specialist

- cabinet maker
- shutter hand
- civil technology educator
- building inspector
- quantity surveyor
- architect
- draughtsperson
- building surveyor
- engineering technician (civil)
- engineering technologist (civil)
- civil engineer

SECTION 3

Content overview and outline

CIVIL SERVICES

3.1 Content overview: Civil Services

TOPIC	GRADE 10	GRADE 11	GRADE 12
INTRODUCTION	Introduction and orientation to the subject and the three specialisation areas in Civil Technology	Introduction and orientation to the subject civil services	Introduction and orientation to the subject civil services
OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) (Generic)	Requirements of the OHS Act pertaining to: Personal safety, general safety, safety and health aspects associated with storage of materials, HIV/ Aids and awareness of substance abuse	Application of the OHS Act pertaining to: Personal safety, general safety, safety and health aspects associated with storage of materials, HIV/ Aids and awareness of substance abuse	Application of the OHS Act pertaining to: General health and safety related risks in the workplace
OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) (Specific)	Requirements of the OHS Act pertaining to: Health and safety related risks associated with excavations and safe manual handling of heavy loads	Requirements of the OHS Act pertaining to: Health and safety related risks associated with Infections and exposure to raw sewerage and soldering	Application of the OHS Act pertaining to: Health and safety related risks associated with deep manholes, safeguarding of openings and the use of safety harnesses
MATERIALS (Generic)	Basic properties of materials and ingredients of concrete, screed, mortar, timber, bricks, blocks, metals, adhesives and synthetic materials	Application and uses of the following: concrete, screed, mortar, timber, bricks and blocks, metals, alloys, glass and synthetic materials	Preservation and sustainability of materials
MATERIALS (Specific)	Knowledge of the different classes of copper and high density polyethylene pipes	Application and uses of solder and ceramics	Explain chemical reactions between dissimilar materials
EQUIPMENT AND TOOLS (Generic)	Identification and proper use of the following: basic site equipment, bricklaying tools, setting out tools, jointing tools, woodworking tools and plumbing tools	Identification, proper use and care of the following: basic site equipment, hand tools, brick cutting tools, plastering tools, woodworking tools, plumbing tools, power tools and construction machinery	Identification, proper use and care of specialised tools
EQUIPMENT AND TOOLS (Specific)	Identification and proper use of: cutting tools, marking off tools and heating tools	Identification, proper use and care of: cutting tools, holding tools, fastening tools and sheet metal work machines	Identification, proper use and care of pumps, drain cleaning tools, machine tools and testing tools
GRAPHICS AS MEANS OF COMMUNICATION (Generic)	Introduction to graphics as a means of communication. Make basic drawings related to the building industry by applying various scales and exposure to computer-aided drawings	Make advanced drawings by applying various scales, advanced freehand sketching related to the building industry, basic use of computer-aided drawings and interpretation of drawings	Interpretation of advanced drawings related to the building industry

GRAPHICS AS MEANS OF COMMUNICATION (Specific)	Freehand and scale drawings relating to each topic and geometrical constructions related to pattern development. Application of SANS 0143.	Freehand and scale drawings relating to each topic and pattern development (Parallel line method). Application of SANS 0143	Freehand and scale drawings related to each topic and pattern development (Parallel line method and radial line method). Application of SANS 0143
QUANTITIES (Generic)	Calculation of quantities for a simple structure up to floor level. Volumes, areas, linear measurements	Calculation of quantities for a simple structure up to wall plate level. Volumes, areas, linear measurements	Calculation of quantities for subject specific areas
QUANTITIES (Specific)	Determine from given drawings the quantities of materials for elementary plumbing installations	Calculate from given drawings the quantities of materials for a small building	Calculate from given drawings the quantities of bricks, volume of concrete, quantities of hot and cold water supply, waste water and soiled water drainage pipes for a small building, as well as volumes of cylinders and cubes
JOINING (Generic)	Identify and explain the uses of screws and nails	Identify and explain the properties, uses, precautions and applications of adhesives	Identify and explain the uses of fixing agents
JOINING (Specific)	Identify and label from drawings, sketches and sectional views the various methods of joining of pipes, soft solder and sheet metal	Explain the various methods of joining of pipes, soft solder and sheet metal	Explain and apply the various methods of cutting, joining and securing pipe connections for joining of copper, galvanized and uPVC pipes. Explanation and application of soft solder and fixing agents. Drawing & application of stages of obtaining sheet metal joints
SUBJECT SPECIFIC CONTENT FOR CIVIL SERVICES			
CONSTRUCTION ASSOCIATED WITH CIVIL SERVICES	Mixing and mix proportions of concrete plaster and mortar Drawings of brickwork Setting out square angles	Placing, compacting, levelling and curing of concrete for simple floor slabs Drawings of brickwork	Explain, draw and demonstrate how to build a brick and concrete ring manholes Setting out levels and trenches using basic levelling devices Supporting of excavations, back fill and compact trenches
COLD WATER SUPPLY	Properties of water, explanation of the natural water cycle, sources of water and protection of pipes against frost and water purification	Installation procedure and types of pipes used for cold water supply, joints and fittings for pipes, valves and recognised abbreviations and symbols used in cold water systems	Explain working principles, uses and installation of valves, joints and fittings for pipes, water saving devices and repairs and alterations to existing pipe work

STORM WATER	The safe disposal of storm water, responsibilities of municipalities with regard to storm water disposal and regulations governing storm water disposal	The methods of disposing large quantities of water from a dwelling to the municipal storm water system	The regulations pertaining to and methods of disposing large quantities of water from a site to the municipal storm water system
HOT WATER SUPPLY	Introduction to hot water supply, cold water supply to hot water systems, valves and heat transfer in hot water installations	Explain abbreviations and symbols used in hot water systems, the working principles, installation, regulations, advantages and disadvantages of heating units and precautions to be observed when installing hot water installations	Application of abbreviations and symbols used in hot water systems Explain with appropriate sketches the working principles, installation, regulations, advantages and disadvantages of heating units and faults in water systems
ROOF WORK	Knowledge of the purpose, identification, fall, material and methods of fixing and supporting rectangular galvanised sheet metal gutters	Drawings (Development) of corners, outlets and stop ends for rectangular galvanised sheet metal gutters	Explain and apply the installation of rectangular gutters with rectangular galvanised sheet metal and round down pipes to fascia and wall Fabricate stop-ends for a box gutter Develop and cut out GMS sheet metal for vent pipe flashing
DRAINAGE (SEWARAGE) ABOVE AND BELOW GROUND		Explain regulations governing drainage, abbreviations and symbols used in drainage systems, terms and definitions, pipe arrangements, terms and uses of sanitary fitments, flushing devices and water traps. Sewerage treatment	Explain and apply requirements for an efficient drainage system Identify and explain with sectional views the location, purpose, advantages and disadvantages of drainage fixtures Explain with sectional sketches the purpose and working principles of septic tanks, vacuum tanks and French drains Design and draw single-line plans of simple domestic drainage lay-outs Inspection and testing of drains Explain how to remove blockages from soil waste and drain pipes

SANITARY FITMENTS	Identification of sanitary fitments along with their symbols	Identification of working parts, the working principles and labelling of sectional sketches and the uses of sanitary fitments	Identify and explain the working parts, working principles and labelling of sectional sketches, as well as the installation and the uses of sanitary fitments

3.2 Content Outline per Term

GRADE 10 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components: one that is intended to supplement the theory component, and the other that supplements the acquiring of skills and the PAT (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

Correct application of terminology should be used consistently in every lesson.

Week	Topic	Content
3 weeks (12 hours)	**INTRODUCTION** **OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS)** **(Generic)**	Introduction and orientation to the subject and the THREE specialisation areas in Civil Technology. Requirements of the OHS Act pertaining to: Personal safety: • Clothing • Head protection • Eye and ear protection • Footwear General safety: • Hand tools • Power tools • Excavations • Safe site planning and organisation • Safe site working methods • Fire prevention and protection • Types of fires • Fire extinguishers for specific types of fires • Fire triangle (Oxygen, heat and fuel) • Main causes of fire Safety and health aspects associated with storage of materials • On site • In workshops • Hazardous materials in the workplace. E.g. solids, liquids, gases and radioactive material • HIV/Aids Awareness Awareness of substance abuse: • Drugs • Alcohol
	OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Subject specific)**	Requirements of the OHS Act pertaining to: • Safety risks associated with excavations • Safe manual handling of heavy loads

Week	Topic	Content
4 weeks (16 hours)	**MATERIALS** **(Generic)**	Basic properties of materials: • Concrete • Screed • Mortar • Coarse aggregates • Fine aggregates • Cement • Lime • Water Timber: Hard wood, soft wood and board products: • Saligna • Meranti • SA Pine • Shutter board • Ply wood • Block board • Tempered and standard masonite (hard board) Bricks and Blocks: • Clay and cement Metals: Ferrous metals: • Grey cast iron • Ductile cast iron • Wrought iron • Malleable iron • Low carbon steel • Stainless steel Non-ferrous metals: • Aluminium • Bronze • Copper • Lead • Tin • Zinc Adhesives: • PVC adhesives • Silicone • Mastic sealants Synthetic materials: • Thermoplastics • Thermosetting plastics • Polythene • Polypropylene • Polyvinyl chloride
	MATERIALS **(Subject specific)**	Knowledge of the different classes of copper and high density polythene pipes

Week	Topic	Content
2 weeks (8 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification and proper use of the following: Basic site equipment: • Round shovel • Square shovel • Spade • Pick • Wheelbarrow • Metal pegs Bricklaying tools: • Brick trowel • Line block / corner block • Gauge rod • Tingle • Pipe level Setting out tools: • Line and pins • Steel square • Steel tape measure • Folding rule (1 metre in length) • Wooden or metal pegs • Straight edge • Spirit level Jointing Tools: • Long jointer • Short jointer • Pointing trowel • Mastic trowel Woodworking tools: • Wooden mallet • Try square • Marking gauge • Tenon saw • Mortise chisel • Files Plumbing tools: • Pipe vice • Hack saw • Pipe cutters (copper tube) • Reamers • Pipe wrenches (Stilson wrench) • Gas torch • Plumb bob • Adjustable spanner or shifting spanner
1 week (4 hours)	**COMPLETION OF FIRST PHASE OF PAT**	

Civil Services

GRADE 10 – TERM 2

Week	Topic	Content
1 week (4 hours)	**EQUIPMENT AND TOOLS** **(Subject specific)**	Identification and proper use of the following: Cutting tools: • Pipe cutters (steel pipe and link pipe cutter for cast iron pipes) Marking off tools: • Punches (Centre punch, prick punch) • Scriber • Dividers Heating tools: • Soldering iron
5 weeks (20 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Introduction to graphics as a means of communication: • Application of SANS 0143 Building regulations in all drawings • Types of lines; dimensioning and labelling (Code of Practice – SANS) • Basic freehand sketching (related to building industry) Make basic drawings by applying various scales: • Orthographic projection • Isometric views applicable to construction • Instruments and instrument drawings • Floor plan only of a two room rectangular building • Introduction to computer-aided drawings
	GRAPHICS AS MEANS OF COMMUNICATION **(Subject specific)**	Pattern development: • Parallel line method • Basic geometrical constructions relevant to pattern development • Square shapes (square pipe) • Round shapes (cylindrical pipe)
1 week (4 hours)	**QUANTITIES** **(Generic)**	Calculate the following: • Volume of concrete for a straight trench • Square meter of materials such as tiles and brick walls • Length of skirting and quarter round moulding
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 10 – TERM 3

Week	Topic	Content
2 weeks (8 hours)	**QUANTITIES** **(Subject specific)**	Quantities: Determine from given drawings the quantities of elementary plumbing installations for the following: • Hot and cold water installation • Areas of surfaces • Use of SI units of measurements
3 weeks (12 hours)	**JOINING** **(Generic)**	Identify and explain the uses of: Screws: • Countersunk head • Round head • Raised head • Jetting screw • Drywall screw • Self-cutting bolt head screw • Drill tip bolt head screw • Coach screw • Advantages of using screws over nails Nails: • Round wire • Masonry • Clout nail • Steel cut nail • Oval nail • Panel pin • Brad nails • Advantages of using nails over screws
	JOINING **(Subject specific)**	Joining of pipes: Identify and label from drawings, sketches and sectional views the various methods of joining: • Copper • Galvanized pipes • High- and low-pressure polythene pipes Advantages and disadvantages of each type Soft solder: • Knowledge of the process and apparatus • Types of solder • Properties of solder • Soldering irons • Tinning a soldering iron • Flux (types and purpose) Identify the following fixing agents: • Chemical anchors • Sleeve anchors • Spring toggle fixing Sheet metal Drawing sectional views of: • Grooved seamed joint • Overlap joints • Pop rivet joints • Solder joints

Week	Topic	Content
2 weeks (8 hours)	**CONSTRUCTION ASSOCIATED WITH CIVIL SERVICES (Subject specific)**	Concrete Mixing and mix proportions of concrete plaster and mortar (low, medium and high strength) Brickwork: Drawings of front views, sectional views and consecutive layers as seen from above Corners (L shaped) of half brick wall and one brick wall in stretcher bond four courses high Setting out square angles: 3-4-5 method
1 week (4 hours)	**COLD WATER SUPPLY (Subject specific)**	Properties of water: • Smell • Taste • Colour • Boiling and freezing point • Expansion and contraction • Density • Hardness Explanation of the natural water cycle, run-offs to dams and catchment areas Sources of water: (Advantages and disadvantages) • Wells • Boreholes • Fountains • Rivers • Upland and lowland regions Protection of pipes against frost A brief explanation of a typical water purification process
1 week (4 hours)	**STORM WATER (Subject specific)**	Storm water: The safe disposal of storm water in the following ways: Roof gutters to water tanks, surface channels, hard surfaces, manholes, onto road kerbs, methods of channelling storm water to catchments areas. Responsibilities of municipalities with regard to storm water disposal. Regulations governing storm water disposal.
1 week (4 hours)	**CONSOLIDATION AND COMPLETION OF THE PAT**	

GRADE 10 – TERM 4

Week	Topic	Content
3 weeks (12 hours)	**HOT WATER SUPPLY** **(Subject specific)**	Introduction to hot water supply Cold water supply to hot water systems Purpose, type, positioning and regulations of: • Pressure reducing valves • Pressure control valves • Relief valve • Safety valves related to hot water installations Brief explanation of heat transfer in hot water installations: • Radiation • Conduction • Convection Describe different hot water systems: • Balanced and unbalanced systems • High and low pressure systems
1 week (4 hours)	**ROOF WORK** **(Subject specific)**	Gutters (galvanised sheet metal gutters only): Knowledge of the purpose, identification, fall, material and methods of fixing and supporting rectangular gutters
2 weeks (8 hours)	**SANITARY FITMENTS** **(Subject specific)**	Sanitary fitments: Identification of the following sanitary fitments along with their symbols: • W.C.-pans • Wash hand basin • Bath • Shower • Sink • Bidets • Urinals
4 weeks (16 hours)	**CONSOLIDATION, FINAL EXAMINATION AND ASSESSMENT OF PAT**	

GRADE 11 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components: one that is intended to supplement the theory component, and the other that supplements the acquiring of skills and the PAT (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

Correct application of terminology should be used consistently in every lesson.

Week	Topic	Content
1 week (4 hours)	**OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS)** **(Generic)**	Application of the OHS Act pertaining to: Personal safety: • Clothing • Head protection • Eye and ear protection • Footwear General safety: • Hand tools • Power tools • Small plant equipment • Construction methods in the workplace Safety and health aspects associated with storage of materials: • On site • In workshops • Hazardous materials in the workplace. E.g. solids, liquids and gases HIV/Aids: preventative measures Awareness of substance abuse: • Drugs • Alcohol
	OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Subject specific)**	Health risks associated with Infections and exposure to raw sewerage General safety rules to be observed when soldering

Week	Topic	Content
3 weeks (12 hours)	**MATERIALS** **(Generic)**	Application and uses of the following: • Concrete • Screed • Mortar • Coarse aggregates • Fine aggregates • Cement • Lime • Water Timber**:** Hard wood, soft wood and board products: • Saligna • Meranti • SA Pine • Shutter board • Ply wood • Block board • Tempered and standard masonite (hard board) Bricks and Blocks: • Clay and cement Ferrous metals: • Grey cast iron • Ductile cast iron • Wrought iron • Malleable iron • Low carbon steel • Stainless steel Non-ferrous metals: • Aluminium • Bronze • Copper • Lead • Tin • Zinc Alloys: • Brass • Bronze Glass: Properties and uses of: • Clear sheet glass • Translucent glass • Safety glass • Synthetic materials Plastics: • Thermoplastics • Thermosetting plastics • Polythene • Polypropylene • Polyvinyl chloride
	MATERIALS **(Subject specific)** Application and uses of Solder and Ceramics	

Week	Topic	Content
3 weeks (12 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification, proper use and care of the following: Basic site equipment: • Round shovel • Wheelbarrow • Square shovel • Spade • Pick • Dumpy level Hand tools: Brick cutting tools: • Comb hammer • Club hammer • Cold chisel • Bolster • Brick hammer Plastering tools: • Float • Plastering trowel • Hand hawk • Straight edge • Block brush • Corner trowels • Nose trowels • Spirit level Woodworking tools: • Roof square • Rip saw • Cross cut saw • Claw Hammer • Crow bar / Claw bar • Mitre try square • Combination square • Sliding bevel • Cutting gauge • Smooth, jack and trying plane • Wood rasp • Cross pein hammer • Screwdrivers (flat and Phillips blades) Plumbing tools: • Universal pliers • Water pump pliers • Soldering iron • Basin wrench
		Power tools: • Electric drill • Bench grinder • Power screwdriver • Angle grinder • Portable circular saw • Radial arm saw Construction machinery: • Generator (electricity supply) • Concrete mixer • Plate compactor • Rammer

Week	Topic	Content
	EQUIPMENT AND TOOLS **(Subject specific)**	Identification, proper use and care of the following: Cutting tools: • Cold chisels • Tin snips (Bent, straight & universal) • Files (flat, round, square, triangular and half round) • Pipe threader (stocks and dies) Holding tools: • Pliers • Bench vice Fastening tools: • Spanners (ring, open ended and combination) • Pop rivet apparatus • Snapper or riveting tool • Groover or seaming tool Sheet metal work machines: • Guillotine • Sheet bending machine • Pan and box bending machine • Rolling machine
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Make advanced drawings by applying various scales: • Instrument drawings (related to building industry) • Orthographic projection with sections • Different elevations of a building • Vertical sections indicating labelling and measurements in accordance with the SANS for building drawings • Isometric views applicable to construction Freehand sketches relevant to the super structure of a building Basic computer-aided drawings Interpretation of drawings: • Site plan, floor plan and elevation of a basic single storey dwelling • Basic drawing symbols relating to the built environment in accordance with the SANS for building drawings
1 week (4 hours)	**COMPLETION OF FIRST PHASE OF PAT**	

GRADE 11 – TERM 2

Week	Topic	Content
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Subject specific)**	Pattern development: Parallel line method Square shaped (square pipe, square elbow) Round shaped (cylindrical pipe, cylindrical pipe elbow)
2 weeks (8 hours)	**QUANTITIES** **(Generic)**	Calculate quantities of the following materials for a single room building up to wall plate level using dimension paper: • Bricks • Concrete (foundation and floor slab) • Skirtings • Quarter rounds
	QUANTITIES **(Subject specific)**	Calculate from given drawings the quantities of hot and cold water supply, fittings, waste water and soiled water drainage pipes for a small building (use of SI units of measurements)
3 weeks (12 hours)	**JOINING** **(Generic)**	Properties, use, precautions and application of the following adhesives: • Contact glue • PVC adhesives • Silicone • PVA wood glue • Epoxy • Mastic sealant
	JOINING **(Subject specific)**	Joining of pipes Explain the various methods of cutting, joining, bending and securing pipe connections and fittings for copper, galvanized pipes and high- and low-pressure polythene pipes Label and explain the different parts of the joints from sectional sketches Soft solder: • Explain the process and apparatus • Types of solder • Properties of solder • Soldering irons • Tinning a soldering iron • Flux (types and purpose) Explain the use of the following fixing agents: • Chemical anchors • Sleeve anchors • Spring toggle fixing Sheet metal: Drawing and explanation of stages of obtaining: • Grooved seamed joint • Overlap joints • Pop rivet joints • Solder joints • Calculating sheet metal allowance for joints taking into account preparation and where used The student should be able to mark out and cut sheet metal.
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 11 – TERM 3

Week	Topic	Content
2 weeks (8 hours)	**CONSTRUCTION ASSOCIATED WITH CIVIL SERVICES** **(Subject specific)**	Concrete: • Methods and purpose of curing of concrete • Simple floor slabs e.g. slab for manhole • Placing of concrete • Compacting of concrete • Levelling of concrete Brickwork: Drawings of: • Front views • Sectional views • Consecutive layers as seen from above • T-junction of half brick wall and one brick wall in stretcher bond four courses high
3 weeks (12 hours)	**COLD WATER SUPPLY** **(Subject specific)**	Installation and types of pipes used for cold water supply: Uses, advantages, disadvantages, depths of water mains and service pipes and the reasons for this. • Copper pipes • Galvanized pipes • Steel pipes • Non-metallic pipes (different classes of high density polyethylene pipes that must be used for water supply) Joints and fittings for: • Copper pipes • Galvanized pipes • Non-metallic pipes (high density polyethylene pipes) Valves: (Identify and label): • Water meter • Stop cock • Full way valve • Pillar tap • Bib cock • Ball valve • Non-return valve Laying pipes Procedure and line diagrams showing all details of the installation of cold water pipes underground. Explain the correct layout and installation of water supply to buildings as prescribed in the Code of Practice SABS 10252 Part 1. (Installation of water supply to buildings) Abbreviations and symbols used in cold water systems

Week	Topic	Content
2 weeks (8 hours)	**HOT WATER SUPPLY** **(Subject specific)**	Abbreviations and symbols: Explain abbreviations and symbols used in hot water systems Explain the working principles, installation, regulations, advantages and disadvantages of heating units: • High pressure geyser • Solar geyser (low and high pressure), latest technology e.g. evacuated tubes and flat plate collector solar system Hot water installation precautions
2 weeks (4 hours)	**ROOF WORK** **(Subject specific)**	Gutters: Drawings (Development) of corners, outlets and stop ends for rectangular gutters
	STORM WATER **(Subject specific)**	Storm water: The methods of disposing large quantities of water from a dwelling to the municipal storm water system
1 week (4 hours)	**CONSOLIDATION AND COMPLETION OF PAT**	

GRADE 11 – TERM 4

Week	Topic	Content
4 weeks (16 hours)	**DRAINAGE (SEWARAGE) ABOVE AND BELOW GROUND** **(Subject specific)**	Explain regulations governing drainage Identify and explain abbreviations and symbols used in drainage systems Terms and definitions of: • Waste water • Waste water pipe • Waste fixture • Soil water • Soil water pipe • Soil fixture • Sewage • Drain • Drainage installation Pipe arrangements: Explanation of pipe arrangements of: Single stack and stub stack systems of plumbing, advantages and disadvantages Terms and uses of sanitary fitments: Waste fixture: • Sink • Shower • Bath • Wash trough Soil fixture: • Water closet • Urinal • Bidet Flushing devices: Identify and label sectional sketches, location, purpose, advantages and disadvantages of: • Cistern • Flush valve Water traps: Explain the requirements for an efficient trap, identify and label sectional views and sketches, location and function as well as the loss of water seals of traps (causes and prevention): • P-Trap • S-trap • Re-sealing trap • Bottle trap • Gulley trap • Grease trap

Week	Topic	Content
2 weeks (8 hours)	**SANITARY FITMENTS** **(Subject specific)**	Sanitary fitments: Identification of working parts, the working principles and labelling of sectional sketches and the uses of the following sanitary fitments High- and low-level cisterns for water closets (advantages and disadvantages)
4 weeks (16 hours)	**CONSOLIDATION, FINAL EXAMINATION AND ASSESSMENT OF PAT**	

Civil Services

GRADE 12 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components: one that is intended to supplement the theory component, and the other that supplements the acquiring of skills and the PAT. (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

Correct application of terminology should be used consistently in every lesson.

Week	Topic	Content
2 weeks (8 hours)	**OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS)** **(Generic)**	Application of the OHS Act pertaining to general health and safety in the workplace: • Scaffolding • Handling of material • Floors and stairs with open sides • Builders hoist • Ladders
	OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Subject specific)**	Safety risks associated with deep manholes e.g. fumes and gasses Safeguarding of openings The use of safety harnesses when working in high places
1 week (4 hours)	**MATERIALS** **(Generic)** Preservation and sustainability of materials: (As dealt with in Grades 10 and 11) • Painting • Curing • Electroplating • Powder coating • Galvanising	
	MATERIALS (Subject specific)	Explain the following reactions between materials: • Dezincification • Electrolytic reaction (Galvanic corrosion)
2 weeks (8 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification, proper use and care of the following: Specialised tools: • Dumpy level • Laser level • Multi detector
	EQUIPMENT AND TOOLS **(Subject specific)**	Identification, proper use and care of the following: Pumps: • Centrifugal pumps Drain cleaning tools: • Drain cleaning rods Machine tools: • Pipe-thread cutting machine • Drain cleaning machine (Jetting machine) Testing tools: • Water pressure testing pump • Compressed-air tests apparatus

Week	Topic	Content
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Interpretation of advanced drawings: • Site plan, floor plan and elevation of multi storey buildings • Basic drawing symbols relating to the built environment in accordance with the SANS for building drawings
	GRAPHICS AS MEANS OF COMMUNICATION **(Subject specific)**	Pattern development: Parallel line method: • Round shaped (Cylindrical pipe elbow, cylindrical pipe offset) Radial line method: • Pyramid • Square based truncated pyramid • Right cone • Frustum of a right cone • Frustum of a right cone where the top is not parallel to the base • Frustum of a cone with the base not at right angles to the axis (Vent pipe flashing)
2 weeks (8 hours)	**QUANTITIES** **(Subject specific)**	Calculate from given drawings the quantities of bricks for a simple structure and volume of concrete for e.g. a manhole, quantities of hot and cold water supply, fittings, waste water and soiled water drainage pipes for a small building, volumes of cylinders and cubes (Use of SI units of measurements)
1 week (4 hours)	**COMPLETION OF FIRST PHASE OF PRACTICAL ASSESSMENT TASK (PAT)**	

GRADE 12 – TERM 2

Week	Topic	Content
2 weeks (8 hours)	**JOINING** **(Generic)**	Identify and explain the uses of: • Bolts and nuts • Rawl bolts • Plastic plugs • Rawl plugs
	JOINING **(Subject specific)**	Joining of pipes Explain and apply the various methods of cutting, joining and securing pipe connections for joining of: • Copper pipes • Galvanized pipes • uPVC pipes (waste and soil pipes) Label and explain the different parts of the joints from sectional drawings Soft solder: • Explanation and application of the process and use of apparatus • Types of solder • Properties of solder • Soldering irons • Tinning a soldering iron • Flux (types and purpose) • Regulations regarding the use of lead free solder for water installation Explanation and application of the following fixing agents: • Chemical anchors • Sleeve anchors • Spring toggle fixing Sheet metal Drawing and application of stages of obtaining: • Grooved seamed joint • Overlap joints • Pop rivet joints • Solder joints • Calculating sheet metal allowance for joints taking into account preparation and where used. The student should be able to mark out and cut sheet metal.

Week	Topic	Content
3 weeks (12 hours)	**CONSTRUCTION ASSOCIATED WITH CIVIL SERVICES** **(Subject specific)**	Brickwork: Drawings of front views, sectional views and consecutive layers as seen from above Explain, draw and demonstrate how to build a brick manhole to benching height Explain, draw and demonstrate how to build a concrete ring manhole to benching height Setting out: • Set out levels using basic levelling devices • Set out trenches Support excavations in accordance with Occupational Health and Safety regulations Back fill and compact trenches
2 weeks (8 hours)	**COLD WATER SUPPLY** **(Subject specific)**	Valves: Explain working principles, uses and installation of: • Water meter • Stop cock • Full way valve • Pillar tap • Bib cock, ball valve and non-return valve Joints and fittings for: • uPVC pipes (Soil and waste water) • Steel pipes (including flanges) Water saving devices: • Taps • Showers • Toilets Explain and apply repairs and alterations to existing copper pipe work and galvanized mild steel (GMS) pipe work
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 12 – TERM 3

Week	Topic	Content
2 weeks (8 hours)	**HOT WATER SUPPLY** **(Subject specific)**	Abbreviations and symbols: Application of abbreviations and symbols used in hot water systems Explain with appropriate sketches the working principles, installation, regulations, advantages and disadvantages of heating units: • High pressure geyser • Solar geyser (low and high pressure) • Solar heating panel (latest technology e.g. evacuated tubes and flat plate collector solar system) • Heat pumps Faults in water systems: • Explain reasons for a very weak or no discharge from a hot-water tap • Causes • Prevention • Removal of Air locks • Water hammer
2 weeks (8 hours)	**ROOF WORK** **(Subject specific)**	Gutters: Explain and apply the installation of rectangular gutter with rectangular and round down pipes to fascia and wall (GMS and PVC) Fabricate stop-ends for a box gutter Flashings: Frustum flashing for a ventilation pipe on a pitched roof. (Purpose and drawing showing part of the vent pipe, flashing and roof cover) Develop and cut out GMS sheet metal for vent pipe flashing. Fabricate and fit GMS vent pipe flashing
	STORM WATER **(Subject specific)**	The regulations and methods of disposing large quantities of water from a site to the municipal storm water system The safe disposal of storm water in the following ways: Roof gutters to water tanks, surface channels, hard surfaces, manholes, onto road kerbs, methods of channelling storm water to catchments areas. Responsibilities of municipalities with regard to storm water disposal. Regulations governing storm water disposal

Week	Topic	Content
3 weeks (12 hours)	**DRAINAGE (SEWARAGE) ABOVE AND BELOW GROUND** **(Subject specific)**	Pipes and fittings: Requirements for an efficient drainage system Identification and use of drain and soil pipe fittings, junctions and bends Description of methods of joining synthetic drain pipes uPVC Drainage ventilation: Waste pipes, vent valves and anti-siphon pipes Drainage fixtures: Identify and explain with sectional views the location, purpose, advantages and disadvantages of: • Gulley • Inspection eye • Rodding eye • Inspection chamber • Manhole • Ramp Explain with sectional sketches the purpose and working principles of: • Septic tanks • Vacuum tanks • French drains Design and draw single-line plans of simple domestic drainage lay-outs, including the recognised standard abbreviations, colour codes and the applicable regulations Inspection and testing of drains by means of the compressed-air tests only. Identify and label sketches of the testing apparatus with a suitable description of the application of the tests Explain how to remove blockages from soil waste and drain pipes A brief explanation of a typical sewerage treatment process
1 week (4 hours)	**SANITARY FITMENTS** **(Subject specific)**	Identification and explanation of working parts, the working principles and labelling of sectional sketches, as well as the installation and uses of the following sanitary fitments and their connection with the discharge pipes Procedure, materials, regulations and methods of installing sanitary fitments Waste water appliances: • Wash hand basin • Bath • Shower • Sink Soil water appliances: • WC pans • Urinals (single stall)
3 weeks (12 hours)	**TRIAL EXAMINATIONS AND COMPLETION OF THE PAT**	

GRADE 12 – TERM 4

Week	Topic	Content
2 weeks (8 hours)	**SANITARY FITMENTS CONTINUED** **(Subject specific)**	Identification and explanation of working parts, the working principles and labelling of sectional sketches, as well as the installation and uses of the following sanitary fitments and their connection with the discharge pipes Procedure, materials, regulations and methods of installing sanitary fitments Waste water appliances: • Wash hand basin • Bath • Shower • Sink Soil water appliances: • W.C.-pans • Urinals (single stall)
2 weeks (8 hours)	**CONSOLIDATION**	
	END-OF-YEAR EXAMINATIONS	

3.3 Content overview: Construction

TOPIC	GRADE 10	GRADE 11	GRADE 12
INTRODUCTION	Introduction and orientation to the subject and the THREE specialisation areas in Civil Technology		
OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Generic)**	Requirements of the OHS Act pertaining to: Personal safety, general safety, safety and health aspects associated with storage of materials, HIV/Aids and awareness of substance abuse	Application of the OHS Act pertaining to: Personal safety, general safety, safety and health aspects associated with storage of materials, HIV/Aids and awareness of substance abuse	Application of the OHS Act pertaining to general health and safety in the workplace
OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Specific)**	Application and regulation of the OHS Act pertaining to: Personal safety, safety signage in the workshop, safety signage at workplaces requirements of the OHS Act pertaining to radioactive elements, storage, labelling, transportation and disposal	Safety and health aspects associated with storage of materials: On site, in workshops, hazardous materials in the workplace, HIV/Aids preventative measures, awareness of substance abuse, drugs, alcohol	Application of the OHS Act pertaining to general health and safety in the workplace, scaffolding, handling of material, floors and stairs with open sides, builders hoist, ladders
MATERIALS **(Generic)**	Basic properties of materials and ingredients of: concrete, screed, mortar, timber, bricks, blocks, metals, adhesives and synthetic materials	Application and uses of the following: concrete, screed, mortar timber, bricks and blocks, metals, alloys, glass and synthetic materials	Preservation and sustainability of materials
MATERIALS **(Specific)**	Manufacturing processes of clay bricks, face, semi-face, stock, cement bricks Differentiation between cellular and keyed bricks Advantages of bricks having holes over a solid brick	Application and uses of the following: bricks, cement, composite mortar, steel, plastics, adhesives, ferrous metals and non-ferrous metals. Classification and uses of clay bricks and blocks and concrete bricks and blocks. Sketches of bricks	Application and uses of the following: Ready mix concrete, high strength concrete, difference between mass and reinforced concrete, tests, admixtures, properties of ferrous and non-ferrous metals, properties and uses of glass bricks. Purpose, material and methods of fixing cladding
EQUIPMENT AND TOOLS **(Generic)**	Identification and proper use of the following: basic site equipment, bricklaying tools, setting out tools, jointing tools, woodworking tools and plumbing tools, specialised tools, bricklaying tools and plastering tools.	Identification, proper use and care of the following: basic site equipment, hand tools, brick cutting tools, plastering tools, woodworking tools, plumbing tools, power tools and construction machinery	Identification, proper use and care of the specialised tools

EQUIPMENT AND TOOLS **(Specific)**	Identification of measuring, setting out tools, brick cutting tools and plastering tools	Identification of parts, accessories and uses of construction machines, portable power tools and different types of scaffolds	Safe handling, application and care of construction machinery
GRAPHICS AS MEANS OF COMMUNICATION **(Generic)**	Introduction to graphics as a means of communication. Make basic drawings related to the building industry by applying various scales	Make advanced drawings by applying various scales, advanced freehand sketching related to the building industry, basic computer-aided drawings and Interpretation of drawings	Interpretation of advanced drawings related to the building industry
GRAPHICS AS MEANS OF COMMUNICATION **(Specific)**	Freehand sketching and scale drawings of bricks, quarter bat, half bat, bevelled bat, queen closer, king closer, soldier course, sailor course, header course and brick on edge stretcher course Scale drawings of a wall built in stretcher bond showing the alternate plan courses, front elevation with raking back and toothing, end elevation, and block bonding, vertical cross-section through sub-structure of a building	Scale drawings, semi-circular arch, semi-circular rough arch, gauged segmental arch Freehand sketches of wooden single door frame, wooden arched door frame. Floor plan of a house with 3 bedrooms, a sitting room, a kitchen, a toilet and a bathroom.	Detailed scale of drawings. Open eaves, closed eaves, alternate plan courses of a one-and-a-half brick pier built in stretcher and English bond, alternate plan courses of a one-and-a-half brick pier attached to a one brick wall in stretcher and English bond, horizontal sections through brickwork.
QUANTITIES **(Generic)**	Calculation of quantities for a simple structure up to floor level. Volumes, areas, linear measurements	Calculation of quantities for a simple structure up to wall plate level. Volumes, areas, linear measurements	Calculation of quantities for subject specific areas
QUANTITIES **(Specific)**	Calculation of area of foundation, volume of sand, volume of cement, volume of stones, volume of water and quantities for a small building up to floor level	Calculation of the quantity of materials for a building up to wall plate level.	Calculation of the quantity of materials for a building
JOINING **(Generic)**	Identify and explain the uses of screws and nails	Identify and explain the uses of adhesives	Identify and explain the uses of bolts and nuts

JOINING **(Specific)**	Methods of joining steel to concrete, wood to concrete, existing concrete to fresh concrete	Joining bricks to steel doors and windows, aluminium doors and windows, wooden doors and windows Different types, materials and spacing of ties	Methods of roof trusses to brickwork, wall plate to wall, concrete base to steel sections
SUBJECT SPECIFIC CONTENT FOR CONSTRUCTION			
EXCAVATIONS		Describe and discuss with the aid of sketches: Horizontal checks of foundation excavations with the aid of instruments, the purpose of datum peg Keeping excavations free from water using the following methods: pumping out water, creating drains, baling Describe and discuss by means of freehand sketches methods of keeping excavations from collapsing for the following types of soil: loose soil, dry soil, firm soil and loose wet soil	Safety factors and regulations to be considered, before and after excavations are complete, excavating to obtain a level site, excavating to obtain foundation trenches and working in deep trenches Scale drawing of keeping excavations from collapsing on firm ground. Scale drawing of shuttering for shallow trenches
FOUNDATIONS	Definition of: ground bearing, dead load, imposed load. Types of foundations, purpose, functions. Types of soil and soil conditions,timbering, reasons to compact soil. Setting out right angle corners with 3, 4, 5 method. Checking for square: diagonal method. Description, sketches and location of: strip foundation, stepped foundation and raft foundations	Description, sketches and location of: pad, wide strip and short bored (auger) pile foundations	Pile foundations: Reasons for using pile foundations Advantages of using pile foundations Description and methods of installing precast concrete piles, steel tube caisson piles and driven in-situ piles. Longitudinal and cross-sectional drawings through a pile and ground beam

BRICKWORK	Alternate plan courses, front and elevation of a wall built in stretcher bond. Front elevation of a stretcher bond wall showing raking back, toothing and block bonding	Scale drawings of alternate plan courses of corners (quoin), 'T' junctions and cross junctions of walls built in English bond. Front elevation and alternate plan courses of a wall built in English bond Definition of an arch. Differentiation between a rough arch and gauged arches. Sketches of outlines of flat gauged arch, semi-circular arch and segmental arch. Scale drawing of a semi-circular arch	Scale drawings of cavity walls, purpose, advantages and disadvantages. Arches (free hand sketches), semi-circle, flat arch. Beam filling, cladding, arches. Paving: preparation and installation methods. Vertical section through paving. Sketches of basket weave pattern and herring bone pattern
CONCRETE	Definition of concrete, site preparation of placing concrete, mix proportions for low, medium and high strength concrete, types and purpose of admixtures to concrete, purpose of slump test, equipment used for slump test, procedure for conducting slump test, outcomes of slump test, levelling and compacting of concrete, placing, curing, curing temperatures and testing, classification of concrete, advantages of concrete, factors leading to defects in concrete, structural defects in concrete	Reinforcement, square column, round column, 'L' shaped columns, reinforcement for a beam, reinforcement for a concrete floor	Concrete floors and reinforcement in concrete floors
FORMWORK	Definition of formwork and striking of formwork, factors to be observed when striking of formwork, purpose of formwork, materials used for formwork for square columns and circular columns (wood and steel). Label drawings of square and circular columns	Form oils and emulsions. Treatment formwork before and after casting concrete. Properties of a good formwork. Identification of different parts of formwork used for columns, stairs, arches. Methods of erecting formwork and constructional details. Drawing of floor slab, round column (horizontal section), square column (horizontal section). Lintels	Properties of materials used for formwork. Drawing of formwork and methods of erecting formwork for beams, beam with attached floor slab. The use of wedges in formwork

STEEL		Identification and properties of the following steel sections: I-beam, H-beam, U-channel, lip channel, angle iron, uses and sketches of the profiles of the following steel sections: I-beam, H-beam, U-channel, lip channel, angle iron	Designing of gusset plates between tie beam and struts. Concrete beams, cantilever beams and columns. Function and position of reinforcement, materials used for reinforcing and requirements that materials used for reinforcing must comply with, sectional views of concrete beams, cantilever beams and columns to indicate reinforcement. Minimum concrete cover. Form oils and emulsions. Defects that can occur in concrete due to shuttering. Plaster
CAVITY WALLS		The purpose, advantages and disadvantages of cavity walls	Methods of waterproofing frames installed in cavity walls. Methods of sealing off ends of cavity walls
STAIRCASE		Terminology in concrete staircases. General principles of staircase design	Vertical cross-section through a straight flight of concrete staircase. Different profiles and methods of mounting handrails onto balusters and walls
ROOF COVERING		Purpose of roof covering materials, characteristics, properties, advantages and disadvantages of sheet covering and concrete tiles	Purpose of roof covering materials, characteristics, properties, advantages and disadvantages of slate and thatch Scale drawings, SA roof, Lean-to roof, couple roof, close couple roof, collar-tie roof, king post roof and spacing of roof trusses according to roof covering used. Purpose and advantages of roof underlays. Differentiation between purlin and battens

PILING		Purpose and types (preformed, driven in situ and short bored piles). Uses and advantages of piling, SEE FOUNDATIONS	
RIB AND BLOCK FLOOR		Preparation of supporting walls to accommodate rib and block floors	Sketches, advantages, installation method, precaution before and after installation of rib and block/block and beam construction, floor
REINFORCEMENT		Reinforcement for brickwork, purpose, properties, location. Methods of tying reinforcement, spacers used with reinforcements. Identification, uses, sketches and properties of I-beam-channel, lip channel and angle iron	Reinforcement for floors, beams, columns, cavity walls. Defects that can occur in concrete due to shuttering
PLASTER AND SCREED			Mix proportions of plaster, application of plastering, purpose of skimming of plaster, admixtures to plaster, alternative plaster finishes to walls, smooth finish, splatter finish, wavy surface, bagging finish to walls Screed: mix proportions of screed, preparation of floors to receive screed, application of screeds, purpose of screed, admixtures to screed

CIVIL TECHNOLOGY: CONSTRUCTION

GRADE 10

Content Outline per Term

Construction

GRADE 10 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components: one that is intended to supplement the theory component, and the other that supplements the acquiring of skills and the PAT. (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

Correct application of terminology should be used consistently in every lesson.

Week	Topic	Content
3 weeks (12 hours)	**Introduction**	Introduction and orientation to the subject and the THREE specialisation areas in Civil Technology
	OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Generic)**	Requirements of the OHS Act pertaining to: Personal safety: • Clothing • Head protection • Eye and ear protection • Footwear General safety: • Hand tools • Power tools • Excavations • Safe site planning and organisation • Safe site working methods • Fire prevention and protection • Types of fires • Fire extinguishers for specific types of fires • Fire triangle (Oxygen, heat and fuel) • Main causes of fire Safety and health aspects associated with storage of materials: • On site • In workshops • Hazardous materials in the workplace. E.g. solids, liquids and gases HIV/Aids awareness Awareness of substance abuse: • Drugs • Alcohol

Week	Topic	Content
3 weeks (12 hours)	**OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS)** **(Specific)**	Application and Regulation of the OHS Act pertaining to: • Personal safety • Safety signage in the workshop • Safety signage at workplace Radioactive elements: • Labelling • Storage • Transportation • Disposal
4 weeks (16 hours)	**MATERIALS** **(Generic)**	Basic properties of materials: • Concrete • Screed • Mortar • Coarse aggregates • Fine aggregates • Cement • Lime • Water Timber: hard wood, soft wood and board products: • Saligna • Meranti • SA Pine • Shutter board • Ply wood • Block board • Tempered and standard masonite (hard board) Bricks and Blocks: • Clay and cement Metal: Ferrous metals: • Grey cast iron • Ductile cast iron • Wrought iron • Malleable iron • Low carbon steel • Stainless steel Non-ferrous metals: • Aluminium • Bronze • Copper • Lead • Tin • Zinc Adhesives: • PVC adhesives • Silicone • Mastic sealants

Week	Topic	Content
4 weeks (16 hours)		Synthetic materials: • Thermoplastics • Thermosetting plastics • Polythene • Polypropylene • Polyvinyl chloride
	MATERIALS **(Specific)**	Manufacturing processes of bricks: • Clay bricks: face, semi-face, stock • Cement bricks Differentiation between cellular and keyed bricks Advantages of bricks having holes over a solid brick
2 weeks (8 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification and proper use of the following: Basic site equipment: • Round shovel • Square shovel • Spade • Pick • Wheelbarrow • Metal pegs Bricklaying tools: • Brick trowel • Line block/corner block • Gauge rod • Tingle • Pipe level Setting out tools: • Line and pins • Steel square • Steel tape measure • Folding rule (1 metre in length) • Wooden or steel pegs • Straight edge • Spirit level Jointing Tools: • Long jointer • Short jointer • Pointing trowel • Mastic trowel

Week	Topic	Content
	EQUIPMENT AND TOOLS **(Specific)**	Woodworking tools: • Wooden mallet • Try square • Marking gauge • Tenon saw • Mortise chisel • Files Plumbing tools: • Pipe vice • Hack saw • Pipe cutters (copper tube) • Reamers • Pipe wrenches (Stilson wrench) • Blow lamps • Plumb bob • Adjustable spanner or shifting spanner Identification of the following: • Setting out tool: dumpy level Brick cutting tools: • Comb hammer • Club hammer • Cold chisel • Bolster • Sledge hammer Plastering tools: • Wooden/plastic float • Plastering trowel • Hand hawk • Straight edge • Block brush • Corner trowels (internal and external) • Nose trowels
1 week (4 hours)	**COMPLETION OF FIRST PHASE OF PAT**	

GRADE 10 – TERM 2

Week	Topic	Content
6 weeks (24 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Introduction to graphics as a means of communication: • Application of SANS 0143 Building regulations in all drawings • Types of lines; dimensioning and labelling (Code of Practice – SANS). • Basic freehand sketching (related to building industry) Make basic drawings by applying various scales: • Orthographic projection • Isometric views applicable to construction • Instruments and instrument drawings • Floor plan only of a two room rectangular building • Introduction to computer-aided drawings
	GRAPHICS AS MEANS OF COMMUNICATION **(Specific)**	Freehand sketching and scale drawings of the following: • Full Brick • Quarter bat • Half bat • Bevelled bat • Queen closer • King closer • Soldier course • Sailor course • Header course • Brick on edge stretcher course Scale drawings of a wall built in stretcher bond showing: • The alternate plan courses • Front elevation with raking back and toothing • End elevation • Block bonding • Vertical cross-section through sub-structure of a building
1 week (4 hours)	**QUANTITIES** **(Generic)**	Calculate the following: • Volume of concrete for a straight trench • Square meter of materials such as tiles and brick walls • Length of skirting and quarter round moulding
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 10 – TERM 3

Week	Topic	Content
3 weeks (12 hours)	**QUANTITIES** **(Specific)**	Introduction to SI units Calculation of the following: • Area of foundation • Volume of sand • Volume of cement • Volume of stones • Volume of water Quantities for a small building up to floor level
4 weeks (16 hours)	**JOINING** **(Generic)**	Identify and explain the uses of: Screws: • Countersunk head • Round head, raised head • Jetting screw • Drywall screw • Self-cutting bolt head screw • Drill tip bolt head screw • Coach screw Advantages of using screws over nails Nails: • Round wire • Masonry • Clout nail • Steel cut nail • Oval nail • Panel pin • Clout nail • Brad nails Advantages of using nails over screws
	JOINING **(Specific)**	Methods of joining the following items: • Steel to concrete • Wood to concrete • Existing concrete to fresh concrete
2 weeks (8 hours)	**FOUNDATIONS** **(Specific)**	Foundations: • Purpose and functions • Types of soil and soil conditions • Strip and step foundations • Excavations in different types of soil Five principle reasons to compact soil: • Increases load-bearing capacity • Prevents soil settlement and frost damage • Provides stability • Reduce soil contraction, swelling and water seepage • Reduce settling of the soil
1 week (4 hours)	**CONSOLIDATION AND COMPLETION OF THE PAT**	

GRADE 10 – TERM 4

Week	Topic	Content
3 weeks (12 hours)	**CONCRETE AND BRICKWORK** **(Specific)**	• Definition of concrete • Site preparation of placing concrete • Mix proportions for low, medium and high strength concrete • Types and purpose of admixtures to concrete • Purpose of slump test • Equipment used for slump test • Procedure for conducting slump test • Outcomes of slump test • Levelling and compacting of concrete • Placing, curing, curing temperatures and testing • Classification of concrete • Advantages of concrete • Factors leading to defects in concrete • Structural defects in concrete Alternate plan courses, front and elevation of a one brick and half brick wall built in stretcher bond Front elevation of a stretcher bond wall showing raking back, toothing and block bonding Reinforcement for brickwork: • Purpose • Properties • Location Reinforcement for concrete: • Identification • Reason • Qualities • Properties Methods of tying reinforcement Spacers used with reinforcements: • Purpose • Types
3 weeks (12 hours)	**FORMWORK** **(Specific)**	• Definition of formwork • Definition of striking of formwork • Factors to be observed when striking of formwork • Purpose of formwork • Treatment of formwork before and after casting of concrete • Materials used for formwork for square column and circular columns (wood and steel) • Label drawings of square and circular columns
4 weeks (16 hours)	**CONSOLIDATION, FINAL EXAMINATION AND ASSESSMENT OF PAT**	

GRADE 11 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components: one that is intended to supplement the theory component, and the other that supplements the acquiring of skills and the PAT. (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

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Week	Topic	Content
1 week (4 hours)	**OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) (Generic)**	Application of the OHS Act pertaining to: Personal safety: • Clothing • Head protection • Eye and ear protection • Footwear General safety: • Hand tools • Power tools • Small plant equipment • Construction methods in the workplace Safety and health aspects associated with storage of materials: • On site • In workshops • Hazardous materials in the workplace. E.g. solids, liquids and gases HIV/Aids: Preventative measures Awareness of substance abuse: • Drugs • Alcohol

Week	Topic	Content
3 weeks (12 hours)	**MATERIALS** **(Generic)**	Application and uses of the following: • Concrete • Screed • Mortar • Coarse aggregates • Fine aggregates • Cement • Lime • Water Timber**:** Hard wood, softwood and board products: • Saligna • Meranti • SA Pine • Shutter board • Ply wood • Block board • Tempered and standard masonite (hard board) Bricks and Blocks: • Clay and cement Metal: Ferrous metals: • Grey cast iron • Ductile cast iron • Wrought iron • Malleable iron • Low carbon steel • Stainless steel Non-ferrous metals: • Aluminium • Bronze • Copper • Lead • Tin • Zinc Alloys: • Brass • Bronze
		Glass: Properties and uses of: • Clear sheet glass • Translucent glass • Safety glass Synthetic materials: • Thermoplastics • Thermosetting plastics • Polythene • Polypropylene • Polyvinyl chloride

Week	Topic	Content
3 weeks (12 hours)	**MATERIALS** **(Generic)**	**MATERIALS** **(Specific)** Classification according to use and quality and sketches of: Clay bricks: • Solid • Keyed • Cellular • Perforated Clay blocks: • Hollow Concrete bricks: • Solid • Cellular • Perforated Concrete blocks: • Hollow • Solid • Paving bricks Sketches and uses of the following: • Queen closer • King closer • Bull nose bricks (external and internal return) Materials in built environment: • Properties of bricks • Manufacturing process of bricks • Manufacturing process of cement • Definition of medium strength concrete (25 MPa) • Compo mortar • Properties of steel (ferrous and non-ferrous metals)

Week	Topic	Content
3 weeks (12 hours)	**MATERIALS** **(Generic)**	Bricks and Blocks: • Clay and concrete Ferrous metals: • Grey cast iron • Ductile cast iron • Wrought iron • Malleable iron • Low carbon steel • Stainless steel Basic properties of materials and ingredients of: Non-ferrous metals: • Aluminium • Bronze • Copper • Lead • Zinc Plastics: • Thermoplastics • Thermosetting plastics • Polythene • Polypropylene • Polyvinyl chloride Adhesives: • PVC adhesives • Silicone • Mastic sealants Differentiation between the following types of concrete: • Mass concrete • Reinforced concrete • Pre-stressed concrete

Week	Topic	Content
3 weeks (12 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification, proper use and care of the following: Basic site equipment: • Round shovel • Wheelbarrow • Square shovel • Spade • Pick • Dumpy level Hand tools: Brick cutting tools: • Comb hammer • Club hammer • Cold chisel • Bolster • Brick hammer Plastering tools: • Float • Plastering trowel • Hand hawk • Straight edge • Block brush • Corner trowels • Nose trowels • Spirit level Woodworking tools: • Roof square • Rip saw • Cross cut saw • Claw hammer • Crow bar / Claw bar • Mitre try square • Combination square • Sliding bevel • Cutting gauge • Smooth, jack and trying plane • Wood rasp • Cross pein hammer • Screwdrivers (flat and Phillips blades)

Week	Topic	Content
		Plumbing tools: • Universal pliers • Water pump pliers • Soldering iron • Basin wrench Power tools: • Electric drill • Bench grinder • Power screwdriver • Angle grinder • Portable circular saw Construction machinery: • Generator (electricity supply) • Concrete mixer • Plate compactor • Rammer
	EQUIPMENT AND TOOLS **(Specific)**	Identification of parts, accessories and uses of the following construction machines: • Portable concrete vibrator • Concrete mixer • Power float Identification and use of the following equipment: • Dependent scaffolding • Independent scaffolding • Builders trestle • Tower scaffolding • Putlog scaffold • Mobile scaffold
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Make advanced drawings by applying various scales: • Instrument drawings (related to building industry) • Orthographic projection with sections • Different elevations of a building • Vertical sections indicating labelling and measurements in accordance with the SANS for building drawings • Isometric views applicable to construction Freehand sketches relevant to the super structure of a building Basic computer-aided drawings Interpretation of drawings: • Site plan, floor plan and elevation of a basic single storey dwelling • Basic drawing symbols relating to the built environment in accordance with the SANS for building drawings
1 week (4 hours)	**COMPLETION OF FIRST PHASE OF PAT**	

GRADE 11 – TERM 2

Week	Topic	Content
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Specific)**	Scale drawings of the following: • Semi-circular arch • Semi-circular rough arch • Gauged segmental arch Freehand sketches of the following: • Wooden single door frame • Wooden arched door frame • Floor plan of a house with 3 bedrooms, a sitting room, a kitchen, a toilet and a bathroom
3 weeks (12 hours)	**QUANTITIES** **(Generic)**	Calculate quantities of the following materials for a single room building up to wall plate level using dimension paper: • Bricks • Concrete (foundation and floor slab) • Skirtings • Quarter rounds
	QUANTITIES **(Specific)**	Calculation of the quantity of materials: Calculate the following materials required for a one room building with a door and a window excluding the roof. Use dimension paper to do the calculation: • The number of bricks required • The square metres of plaster required for the internal walls • Length of lintel required • Floor covering in square metres
2 weeks (8 hours)	**JOINING** **(Generic)**	Properties, use, precautions and application of the following adhesives: • Contact glue • PVC adhesives • Silicone • PVA wood glue • Epoxy • Mastic sealant
	JOINING **(Specific)**	Joining bricks to: • Steel doors and windows • Aluminium doors and windows • Wooden doors and windows Cavity walls: Different types, materials and spacing of ties
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 11 – TERM 3

Week	Topic	Content
2 weeks (8 hours)	**CONSTRUCTION: EXCAVATIONS** **(Specific)**	Describe and discuss with the aid of sketches: • Horizontal checks of foundation excavations with the aid of instruments • The purpose of datum peg Keeping excavations free from water using the following methods: • Pumping out water • Creating drains • Baling Describe and discuss by means of freehand sketches methods of keeping excavations from collapsing for the following types of soil: • Loose soil • Dry soil • Firm soil • Loose wet soil
2 weeks (8 hours)	**FOUNDATIONS** **(Specific)**	Description, sketches and location of: • Pad foundations • Wide strip foundations • Short bored (auger) pile foundations
1 week (4 hours)	**CONCRETE** **(Specific)**	Reinforcement for the following concrete structures: • Square column • Round column • 'L' shaped columns Reinforcement for a beam Reinforcement for a concrete floor

Week	Topic	Content
2 weeks (8 hours)	**FORMWORK** **(Specific)**	Definition of formwork Purpose of formwork Form oils and emulsions Materials used for formwork taking into consideration the following: • The treatment before and after casting concrete • Properties of a good formwork Formwork: materials used and identification of different parts of formwork used for: • Columns • Stairs • Arches • Methods of erecting formwork • Constructional details Drawing of formwork and methods of erecting and supporting for the following: • Floor slab • Round column (horizontal section) • Square column (horizontal section) • Materials used for formwork for square and circular columns (wood and steel) Lintels: • Drawing of formwork and methods of erecting and supporting • Purpose • Use • Types • Sizes of pre-stressed lintels
1 week (4 hours)	**CONSTRUCTION: STEEL** **(Specific)**	Identification, uses, sketches and properties of the following steel sections: • I-beam • H-beam • U-channel • Lip channel • Angle iron
1 week (4 hours)	**CONSTRUCTION: CAVITY WALLS** **(Specific)**	The purpose, advantages and disadvantages of cavity walls
1 week (4 hours)	**CONSOLIDATION AND COMPLETION OF THE PAT**	

GRADE 11 – TERM 4

Week	Topic	Content
2 weeks (8 hours)	**CONSTRUCTION: CAVITY WALLS** **(Specific)**	Scale drawings of the following: • Vertical section through a cavity wall • Different methods of finishing off openings of tops of cavity walls
2 weeks (8 hours)	**CONSTRUCTION: BRICKWORK** **(Specific)**	Front elevation and alternate plan courses of a wall built in English bond. Scale drawings of alternate plan courses of corners (quoin), 'T' junctions and cross-junctions of walls built in English bond. Waterproofing: Position and method of installing DPC in the following areas in a building: • Windows • Doors • Walls
1 week (4 hours)	**STAIRCASE** **(Specific)**	Concrete staircase: • Terminology in staircases • General principles of staircase design
1 week (4 hours)	**ROOF COVERING** **(Specific)**	Roof covering: • Purpose of roof covering • Materials used for roof covering Characteristics of IBR and corrugated iron sheeting under the following heading: • Width • Length available • Weight • Insulation • Wind pressure • Corrosion • Cost Characteristics of concrete roof tiles under the following heading: • Wind pressure • Maintenance • Joining each other • Sizes • Weight • Pitch • Cost Roof underlay: • Materials used • Purpose • Properties
4 weeks (12 hours)	**CONSOLIDATION, FINAL EXAMINATION AND ASSESSMENT OF PAT**	

GRADE 12 – TERM 1

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Week	Topic	Content
2 weeks (8 hours)	**OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) (Generic)**	Application of the OHS Act pertaining to general health and safety in the workplace: • Scaffolding • Handling of material • Floors and stairs with open sides • Builders hoist • Ladders

1 week (4 hours)	**MATERIALS** **(Generic)**	Preservation and sustainability of materials (as dealt with in Grades 10 and 11): • Painting • Curing • Electroplating • Powder coating • Galvanising
	MATERIALS **(Specific)**	Ready mix concrete: • Definition of high strength concrete (30 MPa) • Advantages • Disadvantages • Methods of pumping concrete to higher levels in a building Testing of concrete: Equipment, purpose used, procedure and outcomes: • Slump test • Cube test Curing: • Different materials used for curing • Application of the different materials Metals: Basic properties of ferrous metals such as: • Cast iron • Steel • Low/medium/high carbon steel • Galvanised sheet metal Basic properties of the following non-ferrous metals: • Aluminium • Lead • Zinc • Copper • Tin Alloys (Brass) Glasses (uses of glass in the built environment) Plastics: Basic properties and uses of the following plastics: • Perspex • PVC (polyvinylchloride) • Polystyrene • Silicon Cladding: • Purpose • Materials used • Methods of fixing

2 weeks (8 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification, proper use and care of the following: Specialised tools: • Dumpy level • Laser level • Multi detector
	EQUIPMENT AND TOOLS **(Specific)** Safe handling and care of the following construction machinery: • Portable concrete vibrator • Concrete mixer • Plate compactor • Tamping rammer • Power trowel float	
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Interpretation of Advanced drawings: • Site plan, floor plan and elevation of multi storey buildings • Basic drawing symbols relating to the built environment in accordance with the SANS for building drawings
	GRAPHICS AS MEANS OF COMMUNICATION **(Specific)**	Detailed scale drawings of the following: • Open eaves • Closed eaves • Alternate plan courses of a one-and-a-half brick pier built in stretcher and English bond • Alternate plan courses of a one-and-a-half brick pier attached to a one brick wall in stretcher and English bond • Horizontal sections through brickwork showing how timber window and door frames are built into walls • Horizontal sections through brickwork showing how steel window and door frames are built into walls
2 weeks (8 hours)	**QUANTITIES** **(Specific)**	Calculation of the quantity of all materials required for a small building with two rooms to include: • Concrete for foundations • Hardcore • Blinding layer • DPC • DPM • Reinforcement for floor • Concrete for floor • Screed • Skirting • Walls (deduct for openings) • Doors • Windows • Floor covering • Wall plate • Roof material including covering
1 week (4 hours)	**COMPLETION OF FIRST PHASE OF THE PAT**	

GRADE 12 – TERM 2

Week	Topic	Content
2 weeks (8 hours)	**JOINING** **(Generic)**	Identify and explain the uses of*:* • Bolts and nuts • Rawl bolts • Plastic plugs • Rawl plugs
	JOINING **(Specific)**	Methods of joining the following items: • Joining roof trusses to brickwork • Wall plate to wall • Concrete base to steel sections
1 week (4 hours)	**BRICKWORK** **(Specific)**	Cavity walls: • Scale drawings of Cavity walls showing constructional details Paving: • Ground preparation • Paving methods • Vertical section through paving showing bedding, damp proof membrane (DPM) where applicable and paving bricks • Sketches of basket weave pattern and herring bone pattern Beam filling: • Purpose • Advantages and disadvantages • Construction detail
2 weeks (8 hours)	**EXCAVATIONS** **(Specific)**	Safety factors and regulations to be considered: • Before and after excavations are complete • Excavating to obtain a level site • Excavating to obtain foundation trenches • When working in deep trenches Scale drawing of keeping excavations from collapsing on firm ground indicating the following: • Folding wedges • 152 x 50 walling boards • 152 x 38 poling boards • 100 x 100 struts Scale drawing of shuttering for shallow trenches indicating the following: • Folding wedges • 152 x 50 walling boards • 152 x 38 poling boards • 100 x 100 struts

Week	Topic	Content
2 weeks (8 hours)	**FOUNDATIONS** **(Specific)**	Pile foundations: • Reasons for using pile foundations • Advantages of using pile foundations Description and methods of installing: • Precast concrete piles • Steel tube caisson piles • Driven in-situ piles Longitudinal and cross-sectional drawings through a pile and ground beam
	CONCRETE FLOORS **(Specific)**	Rib and block floors: • Preparations of walls to receive ribs • Factors to be considered before, during and after installations • Safety factors to be considered before, during and after installations • Materials used for rib and block floors • Installation procedure • Advantages and disadvantages of using rib and block floors • Sketches through a rib and block floor
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 12 – TERM 3

Week	Topic	Content
3 weeks (12 hours)	**REINFORCEMENT IN CONCRETE** **(Specific)**	Reinforcing in concrete: • Floors • Beams • Columns Materials, identification and requirements that materials used for reinforcing must comply with: • Draw sectional views of concrete beams, cantilever beams and columns to indicate reinforcement • Minimum concrete cover • Form oils and emulsions • Defects that can occur in concrete due to shuttering
1 week (4 hours)	**CONSTRUCTION: ROOF** **(Specific)**	Scale drawings of the following types of roof trusses: • SA roof truss with maximum span of 10 metres • Lean-to roof • Couple roof • Close couple roof • Collar-tie roof • King post roof Spacing of roof trusses according to roof covering used Purpose and advantages of roof underlays Differentiation between purlin and battens
2 weeks (4 hours)	**FORMWORK** **(Specific)**	Properties of materials used for formwork Drawing of formwork and methods of erecting and supporting the following: • Beams • Beam with attached floor slab • Straight flight of stairs with a landing • The use of wedges in formwork
1 week (4 hours)	**CONSTRUCTION: BRICKWORK** **(Specific)**	Beam filling: • Constructional details • Purpose • Advantages Arches: • Purpose, constructional details, advantages, disadvantages and support during construction of semi-circular and flat arches, closed and open lagging • Differentiation between rough arches and gauged arches
3 weeks (12 hours)	**CONSOLIDATION AND COMPLETION OF THE PAT**	

GRADE 12 – TERM 4

Week	Topic	Content
1 week (4 hours)	**STAIRCASE** **(Specific)**	Stairs: • Vertical cross-section through a straight flight of concrete staircase with a landing showing balustrade and hand rail • General principles involved in designing a concrete staircase • Different profiles and methods of mounting handrails onto balusters and walls
1 week (4 hours)	**CONSTRUCTION:** **PLASTER AND SCREED** **(Specific)**	Plaster: • Mix proportions of plaster • Application of plastering • Purpose of skimming of plaster • Admixtures to plaster Alternative plaster finishes to walls: • Smooth finish • Splatter finish • Wavy surface • Bagging finish to walls Screed: • Mix proportions of screed • Preparation of floors to receive screed • Application of screeds • Purpose of screed • Admixtures to screed
2 weeks (8 hours)	**CONSOLIDATION**	
	END OF YEAR EXAMINATION	

3.4 Content overview: Woodworking

TOPIC	GRADE 10	GRADE 11	GRADE 12
INTRODUCTION	Introduction and orientation to the subject and the THREE specialisation areas in Civil Technology		
OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Generic)**	Requirements of the OHS Act pertaining to: Personal safety, general safety, safety and health aspects associated with storage of materials, HIV/ Aids and awareness of substance abuse	Application of the OHS Act pertaining to: Personal safety, general safety, safety and health aspects associated with storage of materials, HIV/Aids and awareness of substance abuse	Application of the OHS Act pertaining to general health and safety in the workplace
OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Specific)**	Definition and advantages associated with good housekeeping practice in the workshop and site		
MATERIALS **(Generic)**	Basic properties of materials and ingredients of: concrete, screed, mortar, timber, bricks, blocks, metals, adhesives and synthetic materials	Application and uses of the following: concrete, screed, mortar timber, bricks and blocks, metals, alloys, glass and synthetic materials	Preservation and sustainability of materials
MATERIALS **(Specific)**	Sketch and labels of the cross-section of a tree trunk. Description and sketches of timber defects	Seasoning of timber. Methods of conversion of logs into timber. Application and uses of timber	The procedure, properties tested and the advantages of grading timber. Methods of applying various types of preservatives on timber. Factors to be considered in the selection of timber
EQUIPMENT AND TOOLS **(Generic)**	Identification and proper use of the following: basic site equipment, bricklaying tools, setting out tools, jointing tools, woodworking tools and plumbing tools	Identification, proper use and care of the following: basic site equipment, hand tools, brick cutting tools, plastering tools, woodworking tools, plumbing tools, power tools and construction machinery	Identification, proper use and care of specialised tools
EQUIPMENT AND TOOLS **(Specific)**	Identification of measuring tools, setting out tools, cutting tools, knocking tools and files	Identification of parts, accessories and uses of woodworking machines and portable woodworking machines	Safe handling and care of portable and fixed woodworking machines

GRAPHICS AS MEANS OF COMMUNICATION **(Generic)**	Introduction to graphics as a means of communication. Make basic drawings related to the building industry by applying various scales	Make advanced drawings by applying various scales, advanced freehand sketching related to the building industry, basic computer-aided drawings and interpretation of drawings	Interpretation of advanced drawings related to the building industry
GRAPHICS AS MEANS OF COMMUNICATION **(Specific)**	Freehand sketching of workbench accessories. Sketches in good proportion of joints. Scale drawings of vertical section through frame head and top rail of a door. Cross-sectional views of solid and laminated beam. An isometric drawing of a timber wedge	Application and sketches of woodworking mouldings. Scale drawings of a solid core flush panel door, vertical section through the bottom rail of a casement and the sill, and a horizontal section through a part of a casement showing the vertical glazing bar, casement stile and pane in position	Scale drawing of exploded and assembled isometric view of woodworking joints. Sketches of line diagrams of roof trusses
QUANTITIES **(Generic)**	Calculation of quantities for a simple structure up to floor level. Volumes, areas, linear measurements	Calculation of quantities for a simple structure up to wall plate level. Volumes, areas, linear measurements	
QUANTITIES **(Specific)**	Calculation of materials and sundry items for a simple bathroom cabinet. Cutting list for doors	Calculation of the quantity of materials for a ceiling and skirting for a small room. Develop cutting lists for doors.	Calculation of material required for a small building. Development of a cutting list for a bedroom cupboard from floor to ceiling
JOINING **(Generic)**	Identify and explain the uses of screws and nails	Identify and explain the properties, uses precautions and applications of adhesives	Identify and explain the uses of fixing agents
JOINING **(Specific)**	Sketches and application of joints. Properties, uses, precautions and applications of water resistant adhesives for timber	Methods of joining woodworking items to other building materials. Application, uses and drawings of woodworking joints (exploded and assembled views)	Methods of joining woodworking items to structures. Application, uses and drawings of woodworking joints (exploded and assembled views)
SUBJECT SPECIFIC CONTENT FOR WOODWORKING			
CASEMENT	Sketches of vertical and horizontal sections through frame members. Sketches of vertical and horizontal sections through casement members. Identification of members of a single casement within a frame	Horizontal sections through the mullion and casement stiles. Identification and the drawing of the external elevation of a double casement with glazing bars within a frame	Sketch of the vertical section through the transom and adjacent members. Identification and drawing of the external elevation of a double casement with fanlights within a frame

DOORS	Drawings of internal doors. Methods of edging the door. Drawings of external doors	Drawing of front elevations, horizontal and vertical sections and constructional details of external doors	Drawing of front elevations, horizontal and vertical sections and constructional details of purpose made external doors
WALL PANELLING AND CUPBOARDS		Front elevation, horizontal section and vertical section of wall panelling up to dado rail. Working drawings of a frame with two doors to form a built-in cupboard between two walls	Front elevation, horizontal section and vertical section of wall panelling up to ceiling. Joining of strip boards. Working drawings of a built-in and free standing cupboard up to ceiling height
CENTERING		Sketches, methods of construction and erection of centres for flat and semi-circular arches with maximum 900 mm span	Sketches, methods of construction and erection of centres for flat and semi-circular arches with maximum 1 200 mm span
FORMWORK		Definition of formwork and striking. Materials used for formwork. Drawing of formwork and methods of erecting and supporting concrete structures	Properties of materials used for formwork. Drawing of formwork and methods of erecting and supporting horizontal and vertical concrete structures including stairs. The use of wedges in formwork
SHORING		Definition and purpose of shoring. Single line diagrams showing various types of shoring	Single line diagrams showing the components of the shoring for a three storey building
IRONMONGERY		Identification and use of the ironmongery used in woodworking	Identification and use of door and cupboard locks used in woodworking
SUSPENDED TIMBER FLOOR		Scale drawings showing construction methods and the layout of a room with a suspended timber floor, including the vertical section. Sketch showing secret nailing	Sketch of a plan and the vertical section through a suspended timber floor
CEILING		A drawing of the layout of a ceiling for a small room	Constructional details around the trap door of a ceiling
STAIRCASE		Definition of terms used in a single flight staircase	Line diagram with details of a straight flight of stairs with a landing and a staircase well with a half landing

ROOFS			Scale drawings and constructional details of roof trusses. Regulations, purpose and methods of installation of roofs with coverings. Detailed drawings of Eaves. Types and purpose of roof underlay. Modern methods of joining smaller trusses to full trusses. Identification and uses of accessories used in the construction and installation of roofs

CIVIL TECHNOLOGY: WOODWORKING

GRADE 10

Content Outline per Term

Woodworking

GRADE 10 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components: one that is intended to supplement the theory component, and the other that supplements the acquiring of skills and the PAT. (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

Correct application of terminology should be used consistently in every lesson.

Week	Topic	Content
3 weeks (12 hours)	**Introduction**	Introduction and orientation to the subject and the THREE specialisation areas in Civil Technology
	OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Generic)**	Requirements of the OHS Act pertaining to: Personal safety: • Clothing • Head protection • Eye and ear protection • Footwear General safety: • Hand tools • Power tools • Excavations • Safe site planning and organisation • Safe site working methods • Fire prevention and protection • Types of fires • Fire extinguishers for specific types of fires • Fire triangle (Oxygen, heat and fuel) • Main causes of fire Safety and health aspects associated with storage of materials: • On site • In workshops • Hazardous materials in the workplace. E.g. solids, liquids, gases and radioactive material HIV/Aids awareness Awareness of substance abuse: • Drugs • Alcohol
	OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS) **(Specific)**	Definition and advantages associated with good housekeeping practice in the workshop and on site

Week	Topic	Content
4 weeks (16 hours)	**MATERIALS** **(Generic)**	Basic properties of materials of: • Concrete • Screed • Mortar • Coarse aggregates • Fine aggregates • Cement • Lime • Water Timber hard wood, soft wood and board products: • Saligna • Meranti • SA pine • Shutter board • Ply wood • Block board • Tempered and standard masonite (hard board) Bricks and Blocks: • Clay and Cement Metal: Ferrous metals: • Grey cast iron • Ductile cast iron • Wrought iron • Malleable iron • Low carbon steel • Stainless steel Non-ferrous metals: • Aluminium • Bronze • Copper • Lead • Tin • Zinc Adhesives: • PVC adhesives • Silicone • Mastic sealants
		Synthetic materials: • Thermoplastics • Thermosetting plastics • Polythene • Polypropylene • Polyvinyl chloride

Week	Topic	Content
4 weeks (16 hours)	**MATERIALS** **(Specific)**	Sketch and labels of the cross-section of a tree trunk. Description and sketches of the following timber defects: • Heart shake • Cup shake • Star shake • Waney edges • Knots
2 weeks (8 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification and proper use of the following: Basic site equipment: • Round and square shovels • Spade • Pick • Wheelbarrow • Metal pegs Bricklaying tools: • Brick trowel • Line block/corner block • Gauge rod • Tingle • Pipe level Setting out tools: • Line and pins • Steel square • Steel tape measure • Folding rule (1 metre in length) • Wooden or steel pegs • Straight edge • Spirit level Jointing Tools: • Long jointer • Short jointer • Pointing trowel • Mastic trowel Woodworking tools: • Wooden mallet • Try square • Marking gauge • Tenon saw • Mortise chisel • Files

Week	Topic	Content
	EQUIPMENT AND TOOLS **(Specific)**	Plumbing tools: • Pipe vice • Hack saw • Pipe cutters (copper tube) • Reamers • Pipe wrenches (Stilson wrench) • Blow lamps • Plumb bob • Adjustable spanner or shifting spanner Identification of the following: Measuring and setting out tools: • Mortise gauge • Folding rule Cutting tools: • Panel saw • Cross cut saw • Firmer rectangular chisel Knocking tools: • Warrington (cross peen) hammer Files (Rasps): • Round file • Half round file
1 Week (4 hours)	**COMPLETION OF FIRST PHASE OF PAT**	

Woodworking

GRADE 10 – TERM 2

Week	Topic	Content
6 weeks (24 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Introduction to graphics as a means of communication: • Application of SANS 0143 Building regulations in all drawings • Types of lines; dimensioning and labelling (Code of Practice – SANS) • Basic freehand sketching (related to building industry) Make basic drawings by applying various scales: • Orthographic projection • Isometric views applicable to construction • Instruments and instrument drawings • Floor plan only of a two room rectangular building • Introduction to computer-aided drawings
	GRAPHICS AS MEANS OF COMMUNICATION **(Specific)**	Freehand sketching of the following workbench accessories: • Bench hook • Shooting board • Push stick Sketches in good proportion of the following: • Longitudinal half lap joint • Corner half lap joint Scale drawings of the following: • Vertical section through the frame head and top rail of a door • Cross-sectional views of a solid and laminated beam measuring 70 mm thick and 225 mm wide An isometric drawing of a timber wedge
1 week (4 hours)	**QUANTITIES** **(Generic)**	Calculate the following: • Volume of concrete for a straight trench • Square meter of materials such as tiles and brick walls • Length of skirting and quarter round moulding
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 10 – TERM 3

Week	Topic	Content
3 weeks (12 hours)	**QUANTITIES** **(Specific)**	Calculation of materials and sundry items for a simple bathroom cabinet with framed door/s to house a mirror, glass or flat panel Cutting list for the following doors: • One and two panel doors with flat panels • Ledge batten door
4 weeks (16 hours)	**JOINING** **(Generic)**	Identify and explain the uses of: Screws: • Countersunk head • Round head • Raised head • Jetting screw • Drywall screw • Self-cutting bolt head screw • Drill tip bolt head screw • Coach screw Advantages of using screws over nails. Nails: • Round wire • Masonry • Clout nail • Steel cut nail • Oval nail • Panel pin • Clout nail • Brad nails Advantages of using nails over screws
	JOINING **(Specific)**	Sketches and application of the following joints: • Tongue and groove • Finger joint • Butt • Dowel joint Properties, uses, precautions and applications of water resistant adhesives for timber
2 weeks (8 hours)	**CASEMENT** **(Specific)**	Sketches of vertical and horizontal sections through the following frame members of a casement: • Frame head • Frame stile • Sill
1 week (4 hours)	**CONSOLIDATION AND COMPLETION OF THE PAT**	

GRADE 10 – TERM 4

Week	Topic	Content
3 weeks (12 hours)	**CASEMENT** **(Specific)**	Sketches of vertical and horizontal sections through the following members of a casement: • Top rail • Stile • Bottom rail • Glazing bars Identification of various members of an external elevation of a single casement within a frame with no glazing bar
3 weeks (12 hours)	**DOORS** **(Specific)**	Internal doors: Drawing of the front elevations, horizontal sections, application and constructional details of the following doors: • Hollow core flush panel door • Solid laminated flush panel door The option of using alternate materials as panels for flush panels doors. Methods of edging doors. External doors: Drawing of the external and internal elevations, horizontal sections, application and constructional details of a ledge batten door.
4 weeks (16 hours)	**CONSOLIDATION, FINAL EXAMINATION AND ASSESSMENT OF PAT**	

Content Outline per Term

Woodworking

GRADE 11 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components: one that is intended to supplement the theory component, and the other that supplements the acquiring of skills and the PAT. (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

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Week	Topic	Content
1 week (4 hours)	**OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS)** **(Generic)**	Application of the OHS Act pertaining to: Personal safety: • Clothing • Head protection • Eye and ear protection • Footwear General safety: • Hand tools • Power tools • Small plant equipment • Construction methods in the workplace Safety and health aspects associated with storage of materials: • On site • In workshops • Hazardous materials in the workplace. E.g. solids, liquids and gases HIV/Aids: Preventative measures Awareness of substance abuse: • Drugs • Alcohol

Week	Topic	Content
3 weeks (12 hours)	**MATERIALS** **(Generic)**	Application and uses of the following: • Concrete • Screed • Mortar • Coarse aggregates • Fine aggregates • Cement • Lime • Water Timber: Hard wood, soft wood and board products: • Saligna • Meranti • SA pine • Shutter board • Ply wood • Block board • Tempered and standard masonite (hard board) Bricks and Blocks: • Clay and cement Metal: Ferrous metals: • Grey cast iron • Ductile cast iron • Wrought iron • Malleable iron • Low carbon steel • Stainless steel Non-ferrous metals: • Aluminium • Bronze • Copper • Lead • Tin • Zinc Alloys: • Brass • Bronze

Week	Topic	Content
3 weeks (12 hours)	**MATERIALS** **(Generic)**	Glass: Properties and uses of: • Clear sheet glass • Translucent glass • Safety glass Synthetic materials: • Thermoplastics • Thermosetting plastics • Polythene • Polypropylene • Polyvinyl chloride
		MATERIALS **(Specific)** Seasoning of timber: • Definition of seasoning of timber • Description of artificial and natural methods of seasoning • Advantages and disadvantages of artificial and natural methods of seasoning • Reasons • Advantages of seasoning timber Sketches to show conversion of logs into timber using the following methods: • Tangential sawing • Economical • Quarter sawn Application and uses of the following timbers: • Hard wood • Beech • Oak • Yellowwood

Week	Topic	Content
3 weeks (12 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification, proper use and care of the following: Basic site equipment: • Round shovel • Wheelbarrow • Square shovel • Spade • Pick • Dumpy level Hand tools: Brick cutting tools: • Comb hammer • Club hammer • Cold chisel • Bolster • Brick hammer Plastering tools: • Float • Plastering trowel • Hand hawk • Straight edge • Block brush • Corner trowels • Nose trowels • Spirit level Woodworking tools: • Roof square • Rip saw • Cross cut saw • Claw hammer • Crow bar / Claw bar • Mitre try square • Combination square • Sliding bevel • Cutting gauge • Smooth, jack and trying plane • Wood rasp • Cross pein hammer • Screwdrivers (flat and Phillips blades)

Week	Topic	Content
		Plumbing tools: • Universal pliers • Water pump pliers • Soldering iron • Basin wrench Power tools: • Electric drill • Bench grinder • Power screwdriver • Angle grinder • Portable circular saw Construction machinery: • Generator (electricity supply) • Concrete mixer • Plate compactor • Rammer
	EQUIPMENT AND TOOLS **(Specific)**	Identification of parts, accessories and uses of the following woodworking machines: • Table saw • Band saw • Thicknesser / surface planer • Spindle moulder • Radial arm saw • Drill press • Combination belt and disc sander • Lathe Identification of parts and uses of the following portable woodworking machines: • Jig saw • Belt sander • Orbital sander • Router • Electric plane
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Make advanced drawings by applying various scales: • Instrument drawings (related to building industry) • Orthographic projection with sections • Different elevations of a building • Vertical sections indicating labelling and measurements in accordance with the SANS for building drawings • Isometric views applicable to construction Freehand sketches relevant to the super structure of a building Basic computer-aided drawings Interpretation of drawings: • Site plan, floor plan and elevation of a basic single storey dwelling • Basic drawing symbols relating to the built environment in accordance with the SANS for building drawings
1 Week (4 hours)	**COMPLETION OF FIRST PHASE OF PAT**	

GRADE 11 – TERM 2

Week	Topic	Content
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Specific)**	Application and sketches of the profiles in good proportion of the following mouldings: • Different types of skirtings • Architraves • Dado rails • Quadrant • Scotia • Cornice • Rebate • Planted mould • Stuck mould • Ovolo mould Scale drawings of the following: • Solid core flush panel door • Vertical section through the bottom rail of a casement and the sill with the glass in position A horizontal section through a part of a casement showing the vertical glazing bar, casement stile and pane in position
3 weeks (12 hours)	**QUANTITIES** **(Generic)**	Calculate quantities of the following materials for a single room building up to wall plate level using dimension paper: • Bricks • Concrete (foundation and floor slab) • Skirtings • Quarter rounds
	QUANTITIES **(Specific)**	Calculation of the quantity of materials: Calculate the materials required to erect a ceiling for a room measuring 4.5 metres long and 3 metres wide. Include the cornice Calculate the length of skirting required for a room measuring 5 metres long and 3.5 metres wide with a door opening of 900 mm Develop a cutting list to manufacture a two panel door with flat panels

2 weeks (8 hours)	**JOINING** **(Generic)**	Properties, use, precautions and application of the following adhesives: • Contact glue • PVC adhesives • Silicone • PVA wood glue • Epoxy • Mastic sealant
	JOINING **(Specific)**	Methods of joining the following items: • Skirting to a wall • Architrave to a door frame • Door frame to a wall • Cornice to a ceiling • Cupboard to a wall • Shelf to a wall • Mirror to a wall and frame • Window pane to a casement stile • Handles to doors Application, uses and drawings of the following woodworking joints (exploded and assembled views): • Mortice and tenon joint • Double mortice and tenon joint • Bare face tenon
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 11 – TERM 3

Week	Topic	Content
2 weeks (8 hours)	**CASEMENT** **(Specific)**	Sketch of horizontal section through the mullion and adjacent casement stiles with glass and putty in position. Identification of parts and the drawing of the external elevation of a double casement with two horizontal glazing bars within a frame
2 weeks (8hours)	**DOORS** **(Specific)**	External doors: application, drawing of front elevations, horizontal and vertical sections and constructional details of the following doors: • One panel door with flat panels • Two panel door with flat panels with high and middle lock rail • Framed ledge, brace batten doors • Ledge braced batten door
1 week (4 hours)	**WALL PANELLING AND CUPBOARDS** **(Specific)**	Front elevation and vertical section showing methods of installing plywood as wall panelling not exceeding 1200mm high from the fl oor. A horizontal section showing how the joint between two plywood panels are concealed. A vertical section showing the rough grounds and the finish at the top of the panelling with a projecting moulded capping. A vertical section showing the finish at the bottom of the panelling with a moulded skirting and quadrant. Working drawings of a frame with two doors to form a built-in cupboard between two walls showing the following: • Front view with doors and frame • Vertical cross-section showing construction
1 week (4 hours)	**CENTERING** **(Specific)**	Sketches showing methods of construction and erection of centres for the following types of arches with spans not exceeding 900mm: • Flat arch • Semi-circular arch
2 weeks (8 hours)	**FORMWORK** **(Specific)**	Definition of formwork and striking. Materials used for formwork taking into consideration the following: • The treatment before and after casting concrete • Properties of a good formwork Drawing of vertical cross-section of the formwork and methods of erecting and supporting the following: • Lintels • Floor slab Drawing of horizontal cross-section of the formwork and methods of erecting and supporting the following: • Round column • Square column

1 week (4 hours)	**SHORING** **(Specific)**	Definition of shoring Purpose of shoring Single line diagrams showing the components of the following shores for a three storey building: • Raking shore • Flying shore
1 week (4 hours)	**CONSOLIDATION AND COMPLETION OF THE PAT**	

GRADE 11 – TERM 4

Week	Topic	Content
2 weeks (8 hours)	**IRONMONGERY** **(Specific)**	Identification and use of the following fittings: Hinges: • Butt hinge • Tee hinge • Piano hinge • Strap hinge • Sinkless hinge • Parliament hinge Bolts: • Flush bolt • Barrel bolt
2 weeks (8 hours)	**SUSPENDED TIMBER FLOOR** **(Specific)**	Draw to scale the plan of the layout of a room at ground floor with a suspended timber floor, showing the spacing of the floor joists and bearers and also part of the floor boards in one corner of the room. Draw a neat sketch to illustrate the term secret nailing, as applied to the tongue and grooved floor boards
1 week (4 hours)	**CEILING** **(Specific)**	The layout of the brandering for a ceiling for a room 4.5 metres long and 3 metres wide. The spacing of the brandering must be shown and the ceiling boards depicted in broken lines
1 week (4 hours)	**STAIRCASE** **(Specific)**	Definition of the following terms as used in a single flight staircase: • Rise • Riser • Tread/going • Apron • Baluster • Margin • Pitch board • Hand rail • Landing • Storey rod • String
4 weeks (12 hours)	**CONSOLIDATION, FINAL EXAMINATION AND ASSESSMENT OF PAT**	

Content Outline per Term

Woodworking

GRADE 12 – TERM 1

Four hours of contact time is prescribed per week. The time allocated in the week column indicates the time for both the knowledge component and the practical work. Two hours is intended for theory and two hours for practical work. The practical work has two components one that is intended to supplement the theory component and the other that supplement the acquiring of skills and the PAT. (**One double period per week is required for practical work).** Topics should be taught in the sequence that they are listed in the document.

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Week	Topic	Content
2 weeks (8 hours)	**OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (OHS)** **(Generic)**	Application of the OHS Act pertaining to general health and safety in the workplace: • Scaffolding • Handling of material • Floors and stairs with open sides • Builders hoist • Ladders
1 week (4 hours)	**MATERIALS** **(Generic)**	Preservation and sustainability of materials using the following methods discussing its properties, purpose and advantage (as dealt with in Grades 10 and 11): • Painting • Curing • Electroplating • Powder coating • Galvanising
	MATERIALS **(Specific)**	The procedure, properties tested and the advantages of grading timber using the following means: • Mechanical grading • Visual grading of grading Methods of applying preservatives on timber using the following: • Sanding sealer • Lacquer • Varnish • Linseed oil • Wax Factors to be considered in the selection of timber for the following: • Roof truss • Skirting • Doors and windows • Built-in cupboards • Folding table fixed to wall • Staircase including balustrade

Week	Topic	Content
2 weeks (8 hours)	**EQUIPMENT AND TOOLS** **(Generic)**	Identification, proper use and care of the following: Specialised tools: • Dumpy level • Laser level • Multi detector
	EQUIPMENT AND TOOLS **(Specific)** Safe handling and care of the following woodworking machines: • Table saw • Band saw • Thicknesser planer • Spindle moulder • Radial arm saw • Drill press • Combination belt and disc sander • Lathe • Mortising machine Safe handling, care and storage of the following portable woodworking machines: • Jig saw • Belt sander • Orbital sander • Router • Electric plane	
2 weeks (8 hours)	**GRAPHICS AS MEANS OF COMMUNICATION** **(Generic)**	Interpretation of Advanced drawings: • Site plan, floor plan and elevation of multi storey buildings • Basic drawing symbols relating to the built environment in accordance with the SANS for building drawings
	GRAPHICS AS MEANS OF COMMUNICATION **(Specific)**	Scale drawing of exploded isometric view of a long and short shouldered mortice and tenon joint (joint for rebated frames) Scale drawing of an assembled isometric view of a long and short shouldered mortice and tenon joint (joint for rebated frames) Sketches of line diagrams of the following roof trusses: • Lean to roof • Couple roof • Closed couple roof • Collar-tie roof • South African roof (Howe) • King post roof

Week	Topic	Content
2 weeks (8 hours)	**QUANTITIES** **(Specific)**	Calculation of the quantity of materials: Calculation of the following material required for a building measuring 8 metres long and 5 metres wide with a gable roof covered with roof sheeting and tiles. The roof is constructed with a South African roof truss: • Length of wall plate • Number of roof trusses • Number of king posts • Number of rafters • Number of tie beams • Number of queen posts • Number of struts • Length of purlins/battens required • The area of roof underlay • The area of roof sheeting/tiles required • The number of roof sheeting/tiles required • The length of fascia board required • The length of barge board required • The length of ridge capping required Development of a cutting list of materials for a bedroom cupboard from floor to ceiling with a built-in dressing table and mirror in the centre. The built-in has two doors on either side of the dressing table.
1 week (4 hours)	**COMPLETION OF FIRST PHASE OF PAT**	

GRADE 12 – TERM 2

Week	Topic	Content
2 weeks (8 hours)	**JOINING** **(Generic)**	Identify and explain the uses of: • Bolts and nuts • Rawl bolts • Plastic plugs • Rawl plugs
	JOINING **(Specific)**	Methods of joining the following items: • Door to a frame • Ceiling boards to brandering • Brandering to tie beams • Adjacent roof members to each other • Wall plate to wall • Roof trusses to wall plate • Roof tiles to battens • Roof sheeting to purlins Alternate methods of fixing window panes onto casement members and fixed frames. Application, uses and drawings of the following woodworking joints (exploded and assembled views): • Haunched mortice and tenon joint • Twin mortice and tenon joint • Double bare face tenon
1 week (4 hours)	**CASEMENT** **(Specific)**	Sketch of vertical section through the transom, bottom rail of fanlight and top rail of casement with glass and putty in position Identification of parts and the drawing of the external elevation of a double casement with fanlights and two horizontal glazing bars in the casement within a frame
2 weeks (8 hours)	**DOORS** **(Specific)**	External doors: Application, drawing of front elevations, horizontal and vertical sections and constructional details of the following doors: • Three panel door with raised and fielded panels with high lock rail • Four panel door with low lock rail, raised panels and diminishing stile • Framed ledge, brace batten doors with lock and bottom rails 22 mm thick Application, drawing of front elevations, horizontal and vertical sections and constructional details of an entrance door with a shaped top rail and fixed sidelights within a frame. Sketches showing differentiation between a door frame and jamb lining

2 weeks (8 hours)	**WALL PANELLING AND CUPBOARDS** **(Specific)**	Front elevation and vertical section showing methods of installing strip boards (tongue and groove boards) as wall panelling from floor to ceiling. A horizontal section showing how the joint between two strip boards are joined. A vertical section showing the rough grounds and the finish at the top of the panelling. A vertical section showing the finish at the bottom of the panelling with a moulded skirting and quadrant. Working drawings of a built-in and free standing cupboard up to ceiling height to include: • Front view with doors • Front view without doors • Vertical cross-section showing drawer construction, hanging rail and shelves
3 weeks (12 hours)	**CONSOLIDATION, MID-YEAR EXAMINATION AND COMPLETION OF SECOND PHASE OF PAT**	

GRADE 12 – TERM 3

Week	Topic	Content
3 weeks (12 hours)	**ROOFS** **(Specific)**	Scale drawings and constructional details of the following roof trusses: • Lean to roof • Couple roof • Closed couple roof • Collar-tie roof • South African roof (Howe) • King post roof Regulations, purpose, methods of installation, spacing of roof trusses and spacing of purlins/battens for particular types of roof covering. Properties, composition, methods of fixing, advantages and disadvantages of concrete roof tiles, thatch, IBR (inverted box rib) and corrugated iron sheeting. Comparison of the structure and use of a batten and a purlin. Detailed drawings of the following: • Open eaves • Closed eaves Layout of roof trusses for the following types of roof profiles: • A hipped roof with valley • Gable roof Types and purpose of roof underlay. Modern methods of joining smaller trusses to full trusses Identification and uses of: • Hurricane clips • Storm clips • Truss hangers • Gang nails
	CEILING	Constructional details around the trap door of a ceiling
1 week (4 hours)	**CENTERING** **(Specific)**	Sketches showing methods of construction and erection of centres for the following types of arches with spans not exceeding 1 200 mm: • Segmental arch • Semi-circular arch Sketches showing closed and open laggings

2 weeks (8 hours)	**FORMWORK** **(Specific)**	Properties of materials used for formwork Drawing of formwork and methods of erecting and supporting the following: • Beams • Floor slab • Beam with attached floor slab • Straight flight of stairs with a landing • Square, round and rectangular columns The use of wedges in formwork
1 week (4 hours)	**SHORING** **(Specific)**	Single line diagrams showing the components of the following shores for a three storey building: • Dead shore • Double flying shore
	IRONMONGERY **(Specific)**	Identification and use of the following fittings: • Mortise lock • Rim lock • Night latch • Straight cupboard lock • Cut cupboard lock • Drawer or till lock
	SUSPENDED TIMBER FLOOR **(Specific)**	Detailed drawing of the vertical cross-section through a suspended timber floor showing all supports, floor boards, skirting and quadrant including brick pier showing the bearer, floor joist, ant guard and DPC
3 weeks (12 hours)	**CONSOLIDATION AND COMPLETION OF THE PAT**	

GRADE 12 – TERM 4

Week	Topic	Content
1 week (4 hours)	**SUSPENDED TIMBER FLOOR** **(Specific)**	Draw a plan of the layout of a room with a suspended timber floor showing all supports and part of the tongue and groove floor boards.
1 week (4 hours)	**STAIRCASE** **(Specific)**	Line diagram with details of a straight flight of stairs with a landing and a staircase well with a half landing. Hand rail and balustrade to be included.
2 weeks (8 hours)	**CONSOLIDATION**	
	END OF YEAR EXAMINATION	

SECTION 4

ASSESSMENT

4.1 INTRODUCTION

Assessment is a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment. It involves four steps: generating and collecting evidence of achievement; evaluating this evidence; recording the findings; and using this information to understand and thereby assist the learner's development in order to improve the process of learning and teaching.

Assessment involves activities that are undertaken throughout the year. In Grades 10 – 12 assessment should be both informal (Assessment for Learning) and formal (Assessment of Learning). In both cases regular feedback should be provided to learners to enhance the learning experience.

Evidence of all assessments including tests, simulations and tasks should be placed in the learner's script. It is imperative that all items are marked clearly. Items that are loose should be pasted into the script to become a permanent part of a learner's record.

All items in the learner script must contain the following references:

- Date
- Topic
- Homework assignments including a textbook page and exercise reference
- Evidence of scrutiny and interaction from the teacher in red pen
- All teacher actions/interventions in the script should be dated
- Learners are required to mark all self-assessments in pencil and all corrections must be shown in pencil.

As the script is a formal assessment document, the learner is required to cover and keep the script neat and clean. The teacher is required to provide guidance in this respect.

Apart from the learner script, no additional file or portfolio is required.

4.2 INFORMAL OR DAILY ASSESSMENT (ASSESSMENT FOR LEARNING)

Assessment for learning has the purpose of continuously collecting information on learners' achievements that can be used to improve their learning.

Informal assessment is a daily monitoring of learners' progress. This is done through observations, discussions, practical demonstrations, learner-teacher conferences, informal classroom interactions, etc. Informal assessment may be as simple as stopping during the lesson to observe learners or to discuss with learners how learning is progressing. Informal assessment should be used to provide feedback to the learners and to inform planning for teaching, but need not be recorded. It should not be seen as separate from learning activities taking place in the classroom. Learners or teachers can mark these assessment tasks.

Self-assessment and **peer assessment** actively involve learners in assessment. This is important as it allows learners to learn from and reflect on their own performance. The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. In such instances, a simple checklist may be used to record this assessment. However, teachers may use the learners' performance in these assessment tasks to provide verbal or written feedback to learners, the school management team and parents. This is particularly important if barriers to learning or poor levels of participation are encountered. The results of daily assessment tasks **are not taken** into account for promotion and certification purposes.

The following outline provides teachers with informal programmes for assessment that may be followed in order to achieve effective curriculum delivery.

Informal assessment tasks do not contribute towards promotion and progression of the learner. Its sole intention is the development of knowledge and skills in preparation of formal assessment.

ASSESSMENT TASKS	TERM 1	TERM 2	TERM 3	TERM 4
Tests (class, theory and revision tests)	1	1	1	Consolidation
Assignment	1	1	1	0
Class work / case studies / work sheets	Weekly	Weekly	Weekly	0
Homework (theory and practical)	Weekly	Weekly	Weekly	Consolidation
Workshop / practical	Weekly	Weekly	Weekly	0

Evidence of informal assessment will be found in the learner's script. The nature of these tasks is described under assessment for learning.

4.3 FORMAL ASSESSMENT (ASSESSMENT OF LEARNING)

4.3.1 Formal assessment requirements

All assessment tasks that make up a formal programme of assessment for the year are regarded as formal assessment. Formal assessment tasks are marked and formally recorded by the teacher for progression and certification purposes. All formal assessment tasks are subject to moderation for the purpose of quality assurance and to ensure that proper standards are maintained.

Formal assessment provides teachers with a systematic way of evaluating how well learners are progressing in a grade and in a particular subject. Examples of formal assessments include projects, oral presentations, demonstrations, performances, tests, examinations, practical tasks, etc. Formal assessment tasks form part of a year-long formal Programme of Assessment in each grade and subject.

PROGRAMME OF ASSESSMENT		
School-based Assessment SBA	Practical Assessment Task PAT	Final Examination
25%	25%	50%

The formal assessment requirements for Civil Technology are as follows:

- **School-based Assessment (SBA):** SBA, which is written at the end of terms 1, 2 and 3, shows the learner's progress throughout the year and accounts for 25% of the learner's promotion mark.
- In Grades 10 and 11 all SBA is set and moderated internally
- In Grade 12 the formal assessment (25%) is internally set and marked but externally moderated.
- **Practical Assessment Task (PAT):** PAT accounts for the skills the learner has mastered. This is assessed at intervals and requires the learner to engage in multiple practical sessions. During these weekly sessions, skills such as simulation, experimentation, hand skills, tool skills, machine skills and workshop practice are honed and perfected to the point where the learner may engage in the tasks set out for that particular term. The PAT accounts for 25% of the learner's promotion mark.
- In Grades 10 and 11 the Practical Assessment Task is set and marked internally but externally moderated.
- In Grade 12 the Practical Assessment Task is externally set, internally marked and externally moderated.
- **Final examination:** At the end of each academic year every learner is required to write a final examination, which is compiled in such a way that it represents the entire theoretical content covered throughout the year. The Final Examination paper accounts for 50% of the learner's promotion mark and is externally set, marked and moderated.

Formal assessments should cater for a range of cognitive levels and abilities of learners as shown below:

Cognitive Levels	Percentage of Task
Lower order: knowledge	30%
Middle order: comprehension and application	50%
Higher order: analysis, evaluation and synthesis	20%

4.4 PROJECTS

Learners will only do one project per subject per annum.

In Civil Technology, the PAT will serve as the project for learners in Grades 10 – 12. The PAT for Grade 12 is set by the Department of Basic Education and the PAT for Grades 10 and 11 is set internally by the teacher.

A project (in this case the PAT) should require the learner to:

- Plan / prepare / investigate / research to solve the identified problem / task
- Perform the task / carry out instructions (according to criteria given)
- Develop the project according to the given criteria
- Allow for some innovation and creativity.

To set the project, the teacher should:

- Determine the content / skills / knowledge to be addressed
- Set clear criteria and give extensive instructions to guide the learner (the learner should know exactly what to do and what is expected)
- Keep the scope manageable
- Determine which resources will be required to complete the project and ensure that learners have access to these resources
- Determine the time frame / duration / due date
- Determine mark distribution and compile an assessment tool.

4.5 PROGRAMME OF ASSESSMENT

4.5.1 The Programme of Assessment is designed to spread formal assessment tasks in all subjects in a school throughout a term. Without this programme, tests and tasks are crowded into the last few weeks of the term creating unfair pressure on the learners.

The following is the Programme of Assessment for Grades 10 and 11

GRADES 10 AND 11 ASSESSMENT REQUIREMENTS							
ASSESSMENT TASKS	**TERM 1**	**TERM 2**	**TERM 3**	**TERM 4**	**% OF FINAL PROMOTION MARK**		**MARK Weighting**
Tests	1		1		10	25	250 total converted to mark out of **100**
Mid-year examination		1			15		
Practical Assessment Task	☑	☑	☑		25		**100**
Final Examination				1	50		**200**
					TOTAL – PROMOTION MARK		**400**

The table below shows the compilation of the school-based assessment mark:

Description	Time Frame	Weighting of final mark	Mark Allocation
Control test 1	**Term 1** January – April	5%	50
Mid-year examination	**Term 2** May – June	15%	150
Control test 2	**Term 3** July – October	5%	50
Total		25%	250

The following is the Programme of Assessment for Grade 12:

GRADE 12 ASSESSMENT REQUIREMENTS							
ASSESSMENT TASKS	**TERM 1**	**TERM 2**	**TERM 3**	**TERM 4**	**% OF FINAL PROMOTION MARK**		**MARK Weighting**
Tests	1				10	25	450 total converted to mark out of **100**
Mid-year and preparatory examination		1	1		15		
Practical Assessment Task (PAT)	☑	☑	☑		25		**100**
Final Examination				1	50		**200**
					TOTAL – PROMOTION MARK		**400**

The table below shows the compilation of the school-based assessment mark:

Description	Time Frame	Weighting of final 25%	Marks
Control test	Term 1	5%	50
Mid-year Examination	Term 2	7,5%	200
Preparatory Examination	Term 3	7,5%	200
Total		25%	450

4.5.2 Tests

- A test for formal assessment should not consist of a series of small tests, but should cover a substantial amount of content and the duration should be at least 60 minutes with a minimum of 50 marks (allocate one mark per fact).
- Each test must cater for a range of cognitive levels.
- The forms of assessment used should be grade and development level appropriate. The design of these tasks should cover the content of the subject and include a variety of tasks designed to achieve the objectives of the subject.

4.5.3 Examinations

- Each examination must cater for a range of cognitive levels.
- For Grades 10, 11 and 12, the three-hour final examination in Civil Technology comprises 50% (200 marks) of a learner's total mark. All question papers set by the teacher throughout the year, including the final examination paper, must be moderated by the head of department at the school and approved by the district curriculum advisor/facilitator. This is done to ensure that the prescribed weightings are adhered to by the teacher.
- In the Grade 12 examination **only Grade 12 content** will be assessed. However, prior knowledge from Grades 10 and 11 may be necessary to interpret and answer some of the questions.

Grades 10, 11 and 12 Final Examination paper (Civil Services)

The format of the question paper should be followed consistently as prescribed in the table below for every question paper set. Questions may be divided into sub-questions to differentiate between topics, subject to maintaining the total number of marks allocated for specific questions.

	GRADE 10		GRADE 11			GRADE 12		
Section A Generic	**Topic**	**Mark (140)**	**Section A Generic**	**Topic**	**Mark (100)**	**Section A Generic**	**Topic**	**Mark (60)**
Question 1	OHS Safety	20	Question 1	OHS Safety Materials	30	Question 1	OHS Safety Materials Tools & Equipment	20
Question 2	Materials Tools & Equipment	40	Question 2	Tools & Equipment Graphics	40	Question 2	Graphics Joining	40
Question 3	Graphics	40	Question 3	Quantities Joining	30			
Question 4	Quantities Joining	40						
Section B Specific	**Topic**	**Mark (60)**	**Section B Specific**	**Topic**	**Mark (100)**	**Section B Specific**	**Topic**	**Mark (140)**
Integrate the relevant aspects of OHS Safety Materials, Tools & Equipment Graphics Quantities and Joining under each of the questions in the specialisation section of the paper.								
Question 5	Construction associated with civil services Storm water Roof work	30	Question 4	Construction associated with civil services Cold water supply Hot water supply	30	Question 3	Construction associated with civil services	30
Question 6	Hot water supply Cold water supply Sanitary fitments	30	Question 5	Drainage (sewerage) Above and below ground Sanitary fitments	40	Question 4	Cold water supply Hot water supply	40
			Question 6	Graphics as means of communication Roof work Storm water	30	Question 5	Drainage (sewerage) Above and below ground Sanitary fitments	40
						Question 6	Graphics as means of communication Roof work Storm water	30
		60			100			200
TOTAL		200			200			200

Grades 10, 11 and 12 Final Examination paper (Construction)

The format of the question paper should be followed consistently as prescribed in the table below for every question paper set. Questions may be divided into sub-questions to differentiate between topics subject to maintaining the total number of marks allocated for specific questions.

	Gr 10		Gr 11			Gr 12		
Section A Generic	**Topic**	**Mark (140)**	**Section A Generic**	**Topic**	**Mark (100)**	**Section A Generic**	**Topic**	**Mark (60)**
Question 1	OHS Safety	20	Question 1	OHS Safety Materials	30	Question 1	OHS Safety Materials Tools & Equipment	20
Question 2	Materials Tools & Equipment	40	Question 2	Tools & Equipment Graphics	40	Question 2	Graphics Joining	40
Question 3	Graphics	40	Question 3	Quantities Joining	30			
Question 4	Quantities Joining	40						
Section B Specific	**Topic**	**Mark (60)**	**Section B Specific**	**Topic**	**Mark (100)**	**Section B Specific**	**Topic**	**Mark (140)**
Integrate the relevant aspects of these topics into the topics below	OHS Safety Materials Tools & Equipment Graphics Quantities Joining		Integrate the relevant aspects of these topics into the topics below	OHS Safety Materials Tools & Equipment Graphics Quantities Joining		Integrate the relevant aspects of these topics into the topics below	OHS Safety Materials Tools & Equipment Graphics Quantities Joining	
Question 5	Foundations	30	Question 4	Excavations	30	Question 3	Concrete floors	40
Question 6	Formwork	30	Question 5	Steel Construction	30	Question 4	Reinforcement in concrete	40
			Question 6	Brickwork	40	Question 5	Roof	30
						Question 6	Plaster and screed	30
		60			100			200
TOTAL		200			200			200

Grades 10, 11 and 12 Final Examination paper (Woodworking)

The format of the question paper should be followed consistently as prescribed in the table below for every question paper set. Questions may be divided into sub-questions to differentiate between topics subject to maintaining the total number of marks allocated for specific questions.

	Gr 10		Gr 11			Gr 12		
Section A Generic	**Topic**	**Mark (140)**	**Section A Generic**	**Topic**	**Mark (100)**	**Section A Generic**	**Topic**	**Mark (60)**
Question 1	OHS Safety	20	Question 1	OHS Safety Materials	30	Question 1	OHS Safety Materials Tools & Equipment	20
Question 2	Materials Tools & Equipment	40	Question 2	Tools & Equip-ment Graphics	40	Question 2	Graphics Joining	40
Question 3	Graphics	40	Question 3	Quantities Joining	30			
Question 4	Quantities Joining	40						
Section B Specific	**Topic**	**Mark (60)**	**Section B Specific**	**Topic**	**Mark (100)**	**Section B Specific**	**Topic**	**Mark (140)**
Integrate the relevant aspects of these topics into the top-ics below	OHS Safety Materials Tools & Equipment Graphics Quantities Joining		Integrate the relevant aspects of these topics into the top-ics below	OHS Safety Materials Tools & Equip-ment Graphics Quantities Joining		Integrate the relevant as-pects of these topics into the topics below	OHS Safety Materials Tools & Equipment Graphics Quantities Joining	
Question 5	Casement	30	Question 4	Casement Doors Wall panelling	30	Question 3	Casement Doors Wall panelling	40
Question 6	Doors	30	Question 5	Centering Formwork Shoring Ironmongery	30	Question 4	Roofs Ceiling	40
			Question 6	Suspended floor Ceilings Staircase	40	Question 5	Centering Formwork Shoring Ironmongery	40
						Question 6	Suspended floor Staircase	40
		60			100			200
TOTAL		200			200			200

4.6 RECORDING

Recording is a process in which the teacher documents the level of a learner's performance in a specific assessment task. It indicates learner progress towards the achievement of the knowledge as prescribed in the Curriculum and Assessment Policy Statements. Records of learner performance should provide evidence of the learner's conceptual progression within a grade and her/his readiness to progress or be promoted to the next grade. Records of learner performance should also be used to verify the progress made by teachers and learners in the teaching and learning process.

Teachers will record actual marks against the tasks by using a record sheet and also report in percentages against the subject on the learner's report cards.

4.7 REPORTING

Reporting is a process of communicating learner performance to learners, parents, schools and other stakeholders. Learner performance can be reported in a number of ways including report cards, parents' meetings, school visitation days, parent-teacher conferences, phone calls, letters, class or school newsletters, etc. Teachers in all grades report in percentages against the subject.

In order for the school to report back to the parents on the progression of the learner from term to term, regular feedback is given in the form of report cards. When compiling SBA term marks it is proposed that teachers make use of the controlled tests and examination marks as well as simulation and PAT marks to show how the learner is progressing.

The weighting of the term mark will be done in accordance with the tables in paragraph 4.5.1 above.

CODES AND PERCENTAGES FOR RECORDING AND REPORTING

RATING CODE	DESCRIPTION OF COMPETENCE	PERCENTAGE
7	Outstanding achievement	80 – 100%
6	Meritorious achievement	70 – 79%
5	Substantial achievement	60 – 69%
4	Adequate achievement	50 – 59%
3	Moderate achievement	40 – 49%
2	Elementary achievement	30 – 39%
1	Not achieved	0 – 29%

Note: The seven point scale should have clear descriptors that give detailed information for each level.

4.8 MODERATION OF ASSESSMENT

Moderation refers to the process which ensures that the assessment tasks are fair, valid and reliable. Moderation should be implemented at school, district, provincial and national levels. Comprehensive and appropriate moderation practices should be in place for the quality assurance of all subject assessments.

4.8.1 PAT moderation

Moderation of each term's PAT phases can start as early as the following term i.e. phase 1 can be moderated as soon as the second term starts. The final product will be moderated upon completion.

The moderation process is as follows:

- During face moderation learners may be selected at random to demonstrate the different skills developed during the PAT. All phases will be moderated.

- Learners being moderated will have access to their completed project during moderation and may refer to the phases they completed earlier in the year.
- Learners may not ask assistance from other learners during moderation.
- All projects must be on display for the moderator.
- The moderator will select at random a representative sample of projects in accordance with the moderation policy to moderate.
- Upon completion the moderator will, if needed, adjust the marks of the group up or downwards, depending on the decision reached as a result of moderation.
- Normal examination protocols for appeals will be adhered to if a dispute arises from adjustments made.

4.8.2 SBA moderation

Moderation of written tests and examinations will be conducted by the curriculum advisor/facilitator or a peer teacher. Grade 10 and 11 tasks are internally moderated except for the PAT, which is externally moderated. The curriculum advisor/facilitator must moderate a sample of these tasks during school visits, to verify the standard of the internal moderation. Moderation of written tests constitutes a re-mark of the learners work to ensure assessment by the teacher is correct.

Grade 12 tasks should be moderated on three tiers: school, district and province.

School-based moderation requires the HOD to check/control the following:

(a) Learner compliance

- Work done by learners should comply with the following requirements:
- Date
- Topic
- Homework assignments reflecting a textbook page and exercise reference
- Learner scripts are required to show scrutiny and interaction from the teacher in red pen
- All teacher actions/interventions in the script must be dated
- Learners are required to mark all self-assessments in pencil and all corrections to be shown in pencil.

(b) Safety

- Learners are required to dress appropriately when entering the workshop
- Personal safety should be adhered to
- Learner conduct in the workshop must be orderly and appropriate
- Learners are required to enact safety drills, practise safe operating procedures, perform housekeeping tasks and assist in workshop preventative maintenance such as cleaning, painting, sanding, etc.

(c) Practical Assessment Tasks/Session in the workshop

- Learners are required to actively engage in practical assessment tasks, assignments, simulations and experiments
- Learners who are un-cooperative will receive de-merits or a zero mark allocation for that particular section of work
- Learners who act unsafely in a workshop, placing other learners in danger, will be removed from the workshop and will have to perform additional tasks / engage in corrective behaviour tasks to show improvement in safety

awareness and skill. This will be done outside of normal contact time.

(d) Teacher compliance

- Preparation done by the teacher includes:
- Keeping to pace setters / work schedule
- Work schedule dates are planned and achieved dates are indicated
- Lesson preparation for each topic
- Lesson preparation and dates in learners' books are aligned
- Worksheets/tasks/homework assignments in lesson preparations align with learners' books
- Work is done every day in the learners' books
- Workbooks are regularly checked and dated by the teacher
- Tests have memorandums before the test is written
- Examinations and major tests are moderated by a peer teacher / facilitator from relevant district.

(e) Workshop management

- Storeroom is indexed, neat and clean
- Inventory is kept up to date every 6 months
- Workshop is clean and neat
- Preventative maintenance schedule is drawn up
- Workshop budget is prepared and ready
- Procurement schedule for PAT and consumable items are kept up to date
- Replacement of old equipment is planned and rolled out
- OHS Act adhered to at all times.

(f) Classroom management

- Classroom is neat and clean
- Posters and exhibits are evident
- Pin boards are neatly populated
- Teacher workstation/desk is neat and clean
- Filing is neat and tidy.

4.9 PRACTICAL ASSESSMENT TASK (PAT)

The Department of Basic Education issues a PAT for Grade 12 every year. The format of the Grade 12 PAT is duplicated for Grades 10 and 11.

In all grades each learner must do a practical assessment task for the year

- **Grades 10 and 11**: Teachers will set and assess the Practical Assessment Task and it will be moderated externally by the subject specialists.
- **Grade 12:** The practical assessment tasks for Grade 12 will be assessed by the teacher and will be externally

moderated by the provincial subject specialists.

- The date for the external moderation will be decided by the province in which the school is situated.
- The provincial education departments or schools may not change or use the task of the previous year.
- Providing the resources for the Practical Assessment Task is the responsibility of the school and schools should ensure that adequate time and funding is allocated for the completion of the Practical Assessment Task.

Practical sessions should be scheduled in such a way that learners have enough time to practise skills needed for the completion of the PAT. Weekly practice sessions are necessary for the learner to hone the needed skills. A guideline of 2 hours out of 4 hours per week (5 day cycle) is given for Grades 10 – 12.

The ratio of learners per teacher for all practical work is 1 teacher per 15 learners or part thereof. For groups exceeding 15, this means that multiple teachers would be required inside the workshop while practical work is being conducted. Alternatively, groups should be split into numbers below 15 to ensure that a ratio of 1:15 is not exceeded at any time. The motivation for smaller groups lies in the differentiation and mentoring of technical skills that require one on one contact between teacher and learner. The safety of learners is paramount and smaller groups would ensure compliance with the OHS Act 87 of 1993.

4.10 PROGRESSION/PROMOTION

A learner needs to achieve at least 30% of the final mark to pass Civil Technology.

4.11 GENERAL

This document should be read in conjunction with:

4.11.1 National Policy Pertaining to the Programme and Promotion Requirements of the National Curriculum Statements Grades R to 12;

4.11.2 The Policy Document: *National Protocol for Assessment Grades R to 12.*