

## basic education

Department: Basic Education **REPUBLIC OF SOUTH AFRICA** 

# CURRICULUM AND ASSESSMENT POLICY STATEMENT

# (CAPS)

## **CIVIL TECHNOLOGY**

## **FINAL DRAFT**

#### **SECTION 1**

#### NATIONAL CURRICULUM AND ASSESSMENT POLICY STATEMENT FOR CIVIL TECHNOLOGY

#### 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 2011. A single comprehensive Curriculum and Assessment Policy document 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 Statement Grades R - 12: Curriculum and Assessment Policy (January 2011) replaces the National Curriculum Statement Grades R - 9 (2002) and the National Curriculum Statement Grades 10 - 12 (2004).

#### 1.2 Overview

- (a) The National Curriculum Statement Grades R 12 (January 2011) represents a policy statement for learning and teaching in South African schools and comprises the following:
  - (i) Curriculum and Assessment Policy documents for each approved school subject as listed in the policy document *National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF);* and
  - (ii) The policy document National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF).
- (b) The *National Curriculum Statement Grades R 12 (January 2011)* should be read in conjunction with the following documents:
  - 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 Grade R – 12, published in the Government Gazette, No. 29467 of 11 December 2006; 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.
- (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Statements, Learning Programme Guidelines and Subject Assessment Guidelines for Grades R 9 and Grades 10 - 12 are repealed and replaced by the *Curriculum and Assessment Policy documents for Grades R* - 12 (January 2011).
- (d) The sections on the Curriculum and Assessment Policy as contemplated 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 learners 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 our 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 sets high, achievable standards in all subjects;
  - Progression; content and context of each grade shows 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 that 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.

#### 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.	Home Language	6	
II.	First Additional Language	4 (5)	
III.	Mathematics	7	
IV.	Life Skills	6	
	Beginning Knowledge	1 (2)	
	Arts and Craft	2	
	Physical Education	2	
	Health Education	1	

(b) Instructional time for Grades R, 1 and 2 is 23 hours. For Grade 3, First Additional Language is allocated 5 hours and Beginning Knowledge is allocated 2 hours as indicated by the hours in brackets in the table above.

#### 1.4.2 Intermediate Phase

(a) 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

(a) The instructional time in the Senior Phase is as follows:

	Subject	Time allocation per week (hours)		
Ι.	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

(a) 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	4.5		
IV.	Life Orientation	2		
V.	Three Electives	12 (3x4h)		

The allocated time per week may be utilised 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 offer additional subjects, additional time must be allocated for the offering of these subjects.

#### SECTION2

## **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 and to ensure the sustainable use of the natural environment. The subject focuses on three main areas, namely:

- Civil services
- Construction
- Woodworking

The table below indicates the main topics in Civil Technology.

Safety
Materials
Equipment
Graphics and communications
Terminology
Applied mechanics
Construction
Civil services
Quantities
Joining

## 2.2 In Civil Technology learners will study:

- Methods of construction of joinery
- Methods of installation of joinery
- Designing of wooden structures for buildings
- Methods of sustaining wooden installations in a building
- Tools and equipment used in the building industry
- Cabinet making
- Roof construction
- Materials: properties and uses
- Construction: from foundation to wall plate level
- Applied mechanics
- Steel structures
- Quantity surveying
- Graphics and communication
- Sewage and storm-water disposal
- Water supply
- Sanitary fittings and fitments
- Hot water systems
- Reticulation systems

## 2.3 Specific aims

The aim is to develop the skills levels of learners from Grade 10-12 to such an extent that they will be able to, enter a career pathway immediately after obtaining the NSC without delay.

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

- Apprenticeship to become an artisan
- Continue studies at a college in the NC(V) in a vocational career pathway
- Enter higher education at a University of Technology
- Enter higher education at a university (to study engineering)
- Enter the world of work as an entrepreneur or work with an entrepreneur
- Enter higher education to study technical education in order to become a teacher of technology

## 2.4 Requirements for Civil Technology as a subject

- 1. Each learner should have
  - a. A textbook
  - b. Access to a variety of civil engineering and building industry magazines and reference books
- 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.

## 2.5 Infrastructure, equipment and finances for practical work

(Refer to circular S8 of 2006)

Infrastructure, equipment and finances for the subject are the responsibility of the school, and will depend on the Technology subject/s offered at the school.

## SECTION3

## 3.1 CONTENT OUTLINE

Торіс	Content			
	Grade 10	OHSA- Personal and general safety for power and hand tools. Safe storage of material		
Safety	Grade 11	OHSA- Personal and general safety. Safe storage of material. Fire fighting and prevention		
	Grade 12	Application and Regulation of OHSA pertaining to personal safety, hand and power tools.		
Grade 10 Properties of materials		Properties of materials		
Materials Grade 11 Use of materials used in the built environm		Use of materials used in the built environment		
	Grade 12	The sustainability of materials according to their appropriate use and nature (preservation,		
		painting, curing, electroplating, powder coating and galvanising)		
	Grade 10	Use, safe handling and care of hand and power tools: basic site equipment, measuring and		
Equipment		setting out tools, bricklaying tools, woodwork tools		
	Grade 11	Use, safe handling and care of hand and power tools: plastering tools, construction machinery and plumbing tools		
	Grade 12	Use, safe handling and care of hand and power tools: specialised tools and construction machinery		
Graphics and	Grade 10	Line work, freehand sketches of tools and machine parts, orthographic projections, introduction to CAD, symbols used in building drawings. Section through sub-structure of a building		
communications	Grade 11	Freehand sketches of building components, vertical section of building and building components, isometric views of parts of buildings. Section through super-structure of a building		
	Grade 12	Freehand sketches of building components, vertical section of building and building components, isometric views of parts of buildings. Section through entire building. Complete plan for a building		
	Grade 10	Correct application of terminology in every lesson		
Terminology	Grade 11	Correct application of terminology in every lesson		
	Grade 12	Correct application of terminology in every lesson		
Applied	pplied Grade 10 Knowledge and understanding of SI units. Definition of mass, weight, gra			
mechanics determine parallelogram, triangle and polygon of forces. Centre of gravi		determine parallelogram, triangle and polygon of forces. Centre of gravity of regular shapes		
Grade 11 Calculate moments;. Determine solutions graphically for force and bending moments, stress and strain. Centre of g		Calculate moments;. Determine solutions graphically for force diagrams. Reactions, shear force and bending moments, stress and strain. Centre of gravity of regular shapes		
	Grade 12	Calculate moments. Determine solutions graphically for force diagrams. Reactions, shear force and bending moments, stress and strain. Centre of gravity of regular shapes. Use of formulae to calculate stress and strain;. Centroids and centre of gravity of irregular shapes		
Construction         Grade 10         Concrete: mix proportions, grades, te work: stretcher bond, junctions and que Formwork: materials, purpose. Excav soft woods, seasoning, sizes. Steel: r           Finishing: material, thickness and finite materials. cutting list, construction materials.         Formwork: materials.		Concrete: mix proportions, grades, testing. Strip and step foundations; brickwork and block work: stretcher bond, junctions and quoins; Waterproofing: materials for floors and walls. Formwork: materials, purpose. Excavations: setting out, timbering. Woodworking: Hard and soft woods, seasoning, sizes. Steel: rolled steel sections, properties, uses and cross sections. Finishing: material, thickness and finishes to screeds. Cabinet making: Bathroom cabinet: materials, cutting list, construction method and finishing. Technical advances: types and uses		
	Grade 11	Concrete: retaining walls, beams, columns and cantilevers. Reinforcements: materials function and position. Plaster: mix proportion and application. Brickwork and block work: English bond, junctions and quoins, cavity walls, lintels. Waterproofing for windows, doors and walls. Formwork: materials, columns, stairs, arches, scaffolding. Excavations: types and uses of shoring. Woodworking: mouldings, doors and windows, preservation, cutting list. Steel:		

		columns and structural beams, steel doors and windows, cladding. Finishing: plastering, tiling, and painting. Cabinet making: Kitchen cupboards: materials, cutting list, construction method and finishing. Technical advances: types and uses				
	Grade 12	Concrete: piling: purpose and positioning, ready mixed concrete, rib and block floor, reinforcing in concrete, drywall construction. Brickwork and block work: brick bonds, beam filling, arches, stonework and cladding. Waterproofing for floors, roofs and walls. Formwork: materials, scaffolding. Excavations: underpinning. Woodworking: mouldings, ceiling construction, doors and windows, preservation, cutting list, roof trusses. Steel: columns and structural beams, steel doors and windows, cladding, layout of steel roof trusses, gusset plates. Roof covering: Types and methods of installation. Finishing: plastering, tiling, painting, special finishes. Cabinet making: bedroom built-in cupboard: materials, cutting list, construction method and finishing.				
	Grado 10	I echnical advances: types and uses				
Civil services	Grade TO	materials, storage, purilication and distribution of cold water supply. Introduction to drainage: materials, regulations and abbreviations. Introduction to storm-water: materials and regulations. Introduction to electrical systems: regulations and materials				
	Grade 11	Basic plumbing in a house, materials, hot water systems. Drainage for a building. Invert levels. Colour coding. Disposal of storm-water and regulations. Positioning of meter box, distribution board and conduit				
	Grade 12	Cold water supply, plumbing for a house, materials, hot water systems, solar systems, gas water heating system. Alternate fresh water supplies. Desalination. Drainage for a building. Sewage disposal. Regulations, sectional views. Water traps. Conservancy and septic tanks. French drains. Disposal of storm-water and regulations. Electrical symbols. Solar, hydro and nuclear systems				
	Grade 10	Conversion: SI units. Quantities for a small building				
Quantities	Grade 11	Method of extracting quantities for a simple structure such as a garage. Calculating quantities for walls and finishing				
	Grade 12	Method of extracting quantities for a small house. Compare prices from different suppliers.				
Joining	Grade 10	Joining bricks to other materials. Materials used to join timber to timber, bricks and other materials. Methods of joining materials for cold water supply				
	Grade 11	Methods of joining steel, timber and aluminium windows and doors to brickwork. Joining of steel sections. Woodworking joints. Copper pipe joints: capillary and compression				
	Grade 12	Joining bricks to roof trusses. Gusset plates, flanges. Joining column to roof truss. Bolts, screws, nails, gang nails, galvanised straps. Thread joints, PVC weld, flanges				

1	SAFETY &	OHS Act. PERSONAL SAFETY: Safety attire from head to foot. GENERAL SAFETY: Hand		
	PAT	tools and power tools. Safe storage and housekeeping of material on site and in the workshop		
		PAT handout to learners		
2	MATERIALS	Basic properties of materials and ingredients of: concrete and mortar; hard and soft wood;		
		bricks; ferrous metals; non-ferrous metals; plastics ; new materials on the market		
3	EQUIPMENT	Use, care, maintenance and safe handling of hand tools.		
		Basic site equipment: shovels; pick; wheelbarrow; metal pegs		
		Measuring and setting out tools: steel tape measure; folding rule; straight edge; building		
		line; chalk line; steel square (builders); spirit level; transparent pipe level; dumpy level		
		Bricklaying tools: brick trowel; float; line block; club hammer; brick hammer; bolster; cold		
		chisel; jointing tools		
4	EQUIPMENT	Woodwork tools: try and mitre square; sliding bevel; marking gauge; smoothing, jack ad trying		
		plane; rip saw; cross-cut saw; mortise chisel; wood rasp; files; cross pene and claw hammers,		
		and screwdrivers		
		Use, care, maintenance and safe handling of power drill		
5	EQUIPMENT	Use, care, maintenance and safe handling of small plant equipment::		
		Concrete mixer; plate compactor; portable concrete vibrator and portable jack hammer		
6	GRAPHICS AND	Use and care of the following drawing instruments: pencils; eraser; T-square; drawing		
	COMMUNICATION	board; protractor; scale rulers; set squares; compass ; dividers; drawing clips; paper sizes.		
		Graphic representation, identification, description and general application of line types		
		conforming to SANS:A; B; C; D; E; F; G; H		
7	GRAPHICS AND	Freehand sketches of three dimensional and orthographic drawings of simple machine parts		
	COMMUNICATION	and hand tools. Three dimensional scale drawings of objects used in the built environment.		
		Orthographic projection of scale drawings of objects used in the built environment		
8	GRAPHICS AND	Interpretation and application of basic symbols as used in the drawing of plans of buildings		
	COMMUNICATION	of basic single storey dwellings.		
		Introduction to CAD		
9	APPLIED	Knowledge of SI units.		
	MECHANICS	Definition of the following terms: mass; weight; Newton; force; gravity; resultant; equilibrant;		
		equilibrium; parallelogram of forces; centre of gravity. Differentiation between mass and weight		
		Collection of design portfolios of PAT from learners		
10-	REVISION AND END	OF TERM TEST		
11				

Week	Торіс	Content		
1	APPLIED	Bow's notation. Determining graphically triangle, parallelogram and polygon of forces.		
	MECHANICS	Determining centre of gravity of simple shapes		
2	CONSTRUCTION:	CONCRETE: Application and mixing proportions of ingredients set out in a table for low, mediu		
	CONCRETE	and high strength concrete. Differentiation between mass and reinforced concrete. Regulations		
		for simple floor slabs and curing of concrete. The materials, reasons and methods of curing		
		concrete		
3	CONSTRUCTION:	The mixing area, equipment and tools for mixing and placing concrete. Different methods of		
	CONCRETE	mixing concrete: Advantages and disadvantages of hand mixing, machine mixing and ready		
		mixed concrete. Procedure to be followed when placing and compacting concrete. Methods of		
		placing, levelling and floating concrete		
1	CONSTRUCTION	The purpose procedure and apparatus for conducting slump and cube test on concrete. Analysis		
т	CONCRETE	of the outcomes of slump tests		
	MORTAR AND	Purpose uses ingredients mixing methods and proportions of low medium and high strength		
	SCREED	mortar		
	0011220	Purpose, uses, ingredients, mixing methods and proportions, types, preparation of surfaces.		
		placing, thickness and finishes of different types of screeds. Differentiation between monolithic		
		and bonded screeds		
5	CONSTRUCTION:	The purpose, dimensions, reasons, regulations, excavations, timbering, mixing and placing of		
	FOUNDATIONS	concrete for foundations. Differentiation between stepped and strip foundations. Sketches of		
		foundations limited to single storey buildings that must receive a maximum of 1½ brick wide		
		foundation footings		
6	CONSTRUCTION:	Sketches of raking back, toothing and block bonding. Sketches of front, end and alternate plan		
	BRICKWORK AND	courses of walls built in ½ and1 brick wide walls in stretcher bond. The purpose and type of bricks		
	BLOCKWORK	for $\frac{1}{2}$ , 1 and $\frac{1}{2}$ wide brick foundation walls. Sketches of alternate plan courses of $\frac{1}{2}$ and 1 brick		
		wide stretcher bond walls for: T – junctions and corners. Purpose, type, methods and sketches of		
		jointing		
7-10	MID-YEAR EXAMS			
	Collection of drawings	tor PAT from learners		

Week	Topic	Content
1	CONSTRUCTION: WATERPROOFING FORMWORK	Purpose, reasons, regulations, materials, and sketches to show damp proofing for: concrete ground floors; suspended timber ground floors; basement; cavity walls. Definition, purpose, materials, equipment used and treatment of formwork before and after
		casting of concrete.
2	CONSTRUCTION: EXCAVATIONS	Methods of setting out foundations and foundation brickwork for a building for excavation: 3-4-5 method for setting out square corners and checking squareness. Placing and marking of profiles. Excavation: Excavation methods, methods of maintaining the level of foundations. Regulations pertaining to the excavation of trenches. Regulations to protect public and workers. Timbering for hard, firm, dry loose and wet loose soils.
3	Construction: Woodworking	SEASONING OF TIMBER: Definition, reasons, advantages and disadvantages of artificial and natural seasoning TESTING OF TIMBER: Differentiation between mechanical grading and visual grading SIZES OF TIMBER: Schedule of sizes of timber available on the market
4	CONSTRUCTION: CABINET MAKING	<b>FREESTANDING AND SUSPENDED CABINETS:</b> A simple freestanding cabinet with doors and an overhead suspended cabinet where the following are to be given consideration: choice of material, design, finish, cutting list, construction methods, methods of attaching shelves, methods of fixing onto walls
5	CONSTRUCTION: STEEL TECHNICAL ADVANCES	Uses, properties and sketches of cross-section of the following rolled steel sections: round pipe and bar; square tubing and bar; flat bar and rectangular tubing. The following should be given attention: materials, methods, types and uses
6	CIVIL SERVICES: WATER SUPPLY STORM-WATER	The following topics are to be covered: catchment areas, dams and reservoirs, purification methods and plants, distribution to households, brief explanation of the natural water cycle, run- offs to dams and catchment areas. Properties, advantages and disadvantages of materials used in the distribution of water: PVC pipes, copper pipes and galvanised pipes. 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
7	CIVIL SERVICES: Sewerage	Introduction to drainage where the following topics are covered: definition of drainage, differentiation between sewage and sewerage, differentiation between soil water and waste water, ventilation system, soil vent pipes, water traps and gulley, regulations governing drainage, abbreviations and symbols used in drainage systems. Properties, advantages and disadvantages of materials used in a drainage system: PVC pipes and fittings and cast iron pipes
8	CIVIL SERVICES: ELECTRICAL SYSTEM	Introduction of electrical system in a simple building giving consideration to: methods of routing power to a house, kick pipes, conduits (differentiation between concealed and surface mounted), circuits, meter box, distribution board, colour codes of wires. Electrical symbols used in drawings
9	QUANTITIES	A good understanding of the SI units that must lead to the calculation of: areas, volumes and linear measurements. Calculation of all materials required for a sub-structure of a building
10	JOINING: GANG NAILS BRICKS BOLTS AND NUTS	The purpose, method of fixing, and the use of gang nails. The following situations must be considered: joining bricks together, joining other materials to brickwork. The following items must be covered: types of bolts and nuts used to join materials
11	END OF TERM TEST & c	ollection of projects for PAT

Week	Торіс	Content		
1	JOINING: ANCHORS	Metal anchors, sleeve anchors, heavy duty, expansion anchor, cavity anchor, nylon anchor,		
		hammer fix nylon anchor, universal plug and wall plug.		
	SCREWS	The following items must be covered: countersunk head, round head, raised head, jetting		
		screw, drywall screw, self-cutting bolt head screw, drill tip bolt head screw, coach screw.		
	NAILS	Advantages of using screws over nails.		
		The following items must be covered: round wire, masonry, clout nail, steel cut nail, oval nail,		
		panel pin, clout nail, brad nails. Advantages of using nails over screws.		
2	JOINING:	Properties, use, preparation, precautions and application of PVA wood glue, contact glue,		
	GLUES	epoxy glue and mastic sealants		
	TIES	The use and method of fixing metal wall ties and tri-lug for cavity walls		
3	JOINING:	Use and sketches of the following joints:		
	WOOD	Housing: stopped, through, double stopped, through dovetail housing, bareface dovetail		
		housing, stopped dovetail housing		
4	JOINING:	Use and sketches of the following joints:		
	WOOD	Halving joints:		
		stopped dovetail half lap, cross half lap, corner half lap, dovetailed "T" half lap, "T" half lap		
5	REVISION & ASSESSMENT OF PAT			
6	REVISION & ASSESSMENT OF PAT			
7	REVISION & ASSESSMENT OF PAT			
8	FINAL EXAMINATIONS			

## The following is an example of a Programme of Assessment for Grade 10

ASSESSMENT TASKS	TERM 1	TERM 2	TERM 3	TERM 4	% OF FINAL PROMOTION MARK
Tests	1		1		5
Mid-year examination		1			5
Only one of the following must be done per term: practical tasks: simulations/ investigations/ research/ assignment/small projects	1	1	1		15
End-of-year assessment	Written examination		1	50	
	Practical Assessment Task			1	25

1	SAFETY & PAT	Safety practices and regulations related to: construction machinery, site and workshop: excavations; scaffolding; handling of materials; floors and stairs with open sides; builders' hoist; ladders. Fire: prevention, types, extinguishers, fire hose and sprinkler valve systems, fire triangle causes, preventive measures. <b>PAT handout to learners</b>
2	MATERIALS:	Blocks and block work: purpose and use: concrete blocks and landscape blocks
	BLOCKSMETALS	Basic properties and uses of: ferrous metals such as: cast iron; steel; galvanized sheet metal. non-ferrous metals such as: Aluminium, Lead, Zinc, Copper and Tin
3	MATERIALS:	Basic properties and uses of: glass: sheet glass and safety glass
	GLASS & SUNDRY	The properties and uses of: putty, silicone and other methods used to secure glass
4	EQUIPMENT	Use, care, safe handling and maintenance of: hand tools: steel tape measure, straight edge, building line, chalk line, steel square (builders), spirit level, plumb-bob and transparent pipe level Bricklaying tools: brick trowel, float, line block, club hammer, brick hammer, bolster, cold chisel, jointing tools
5	EQUIPMENT	<ul> <li>Woodwork tools: try and mitre square, sliding bevel, marking gauge, smooth / jack and trying plane, rip saw, cross cut saw, mortise chisel, wood rasp, files, cross pene and claw hammer, and screw drivers.</li> <li>Plastering tools: plastering trowel, hand hawk and block brush.</li> <li>Plumbing tools: Stilson (monkey wrench), basin spanner, shifting spanner, pipe cutter, hack-saw and water pump pliers.</li> </ul>
6	EQUIPMENT	<b>Power tools:</b> portable electric circular saw, angle grinder, portable electric plane and router. Use, care, safe handling and maintenance of construction machinery: portable concrete vibrator, concrete mixer, Jack hammer, generator to supply electricity
7	GRAPHICS AND COMMUNICATION	Freehand sketches and instrument drawings: of tools and equipment. Orthographic projection with sections of fittings used in a building. Labelled and dimensioned to SANS specifications: elevations and sections of buildings
8	GRAPHICS AND COMMUNICATION	<b>Isometric view of corner:</b> built-in stretcher bond with three consecutive layers and the fourth course above the rest. <b>Application of CAD</b> in the designing of basic floor plans
9	APPLIED MECHANICS	Calculation of moments subjected to maximum of 3-point load Determining solutions graphically for force diagrams using Bow's notation
10	APPLIED MECHANICS	Calculation of stress and strain of materials.( manipulation of formula) Calculation of centre of gravity of figures with combined regular shapes.
10-11	REVISION AND END-OF- Collection of design portf	TERM TEST olios of PAT from learners

Week	Торіс	Content
1	CONSTRUCTION:	Purpose, reasons, materials, sketches of retaining walls
	RETAINING WALLS BEAMS AND	Concrete beams and columns: types and uses.
	FORMWORK	Formwork: purpose of oils and emulsions and defects that can occur in concrete due to
		formwork
2	CONSTRUCTION:	Function, materials, methods of fixing, minimum cover and position of reinforcement.
	REINFORCEMENT PLASTER	Mixing proportion, application, and preparation of wall for plaster. Purpose of skimming of plaster
3	CONSTRUCTION: CAVITY WALLS	The purpose, method of construction, advantages, disadvantages and constructional details of cavity walls. The purpose and position of wall ties
	BRICKWORK BUILDING-IN ERAMES	The use and drawings of the alternate plan courses of 1 brick wide T- junctions and corners built in English bond
		Methods of setting up, securing and building in door and window frames into walls
4	Construction: Lintels	Purpose, use, types, sizes and sectional detail of lintels. Method of constructing pre-stressed lintels.
	WALL PLATES	Material, purpose, position on wall and method of securing wall plates onto wall
	WATERPROOFING	The materials, properties, position and method of installing DPC in the following areas in a building: windows, doors and walls
5	CONSTRUCTION	Materials and equipment used for formwork for columns, stairs and arches. Methods of erecting
0	FORMWORK	formwork. The type of props and scaffolding and its uses
	EXCAVATIONS: SHORING	Purpose and reasons for using raking and flying shores. Constructional details
6	CONSTRUCTION:	Location, purpose, method of installing and sketching section of profiles of wooden building
	WOODWORKING	components, e.g. skirting, quarter round, cornices and architraves. The layout, construction,
		method of finishing and calculation of material for a ceiling for one room. Drawings of elevation,
		horizontal and vertical sections of a four-panel entrance door and hollow core flush panel
-	00107011071011	Internal door
1		Selection of doors and windows from schedules and catalogues.
	WOODWORKING	I ne need for and method of developing cutting lists for small projects such as bathroom
		Cabinets, doors and root trusses
8 10		Incrine of drawings for PAT from learners
0-10		nection of urawings for FAT from learners

Week	Торіс	Content
1	CONSTRUCTION:	Properties, uses and sketches of profiles of the following steel sections: I-beam, H-
	STEEL	beam, U-channel, lip channel, angle iron. The purpose, advantages and installation
		procedures of cladding to steel structures and walls.
		The advantages, disadvantages and instances of use of steel doors and windows
2	CONSTRUCTION	The preparation of walls, application of rough cast, steel trowelled and wooden floated
	FINISHING:	plaster
	PLASTERING	Planning, preparation, installation procedure and finishing of floor and wall tiles
	TILING	
3	CONSTRUCTION	Preparation of surfaces and various methods of application of paints for: interior and
	FINISHING:PAINTING	exterior purposes.
	CONCEALING	
	CONDUITS	Methods of chasing walls and floors to conceal conduits. Precautions to be taken
4	CONSTRUCTION:	Manufacturing process of a cabinet taking the following into consideration: choice of
	CABINET MAKING	materials, cutting list, construction method and finishing, e.g. bathroom cabinets,
	TECHNICAL	kitchen cupboards, etc.
	ADVANCES	Properties and use of new materials and new construction techniques
		Properties and use of new materials and new construction techniques
5	CIVIL SERVICES:	Basic plumbing in a house to include:
	WATER SUPPLY	Fitments, distribution and placement of pipes(surface or chased)
	HOT WATER SYSTEMS	Turner of all an attained for bot and cald under such the last of the bot water
		Types of pipe materials used for not and cold water supply. Introduction to not water
		systems, bollers, pressure geysers and gravity geysers, working principles of
		of procesure reducing values
6	CIVIL SERVICES:	Line diagram of the layout of a drainage plan for a simple single-storey dwelling, up to
	SEWERAGE	the connection point of the local authority (taking into account abbreviations, gradient,
		regulations and drainage principles).
		The calculation of invert levels at the top and bottom of drains. The following must be
		considered: regulations, colour coding and sectional view (identification of different
		components)
7	CIVIL SERVICES:	The regulations and methods of disposing of large quantities of water from a site to
•	STORM-WATER	the municipal storm-water system
	ELECTRICAL SYSTEM	
		The installation and location of :
		meter box, distribution box, card supply (prepaid) box and conduits
8	QUANTITIES	Method of extracting quantities of materials for a simple structure such as a garage
		and walls and finishings in a building by applying basic mathematical formulae.
9	REVISION & collection of	projects for PAT

Week	Торіс	Content
1	JOINING: STEEL	Methods of joining steel sections, e.g. flanges, gusset plates
2	JOINING: BRICKWORK	Materials and methods used to join brickwork to: steel doors and windows, wooden doors
		and windows and aluminium doors and windows
3	JOINING:WOOD	Sketches and uses of the following joints used for cupboard construction: mortise and
		tenon, butt joint, dowel joint, biscuit joint, mitre, and housing.
4	JOINING:	Joining methods of: capillary joint and compression joints
	PLUMBING PIPES	Materials and installation of pipes for cold water supply under ground level from municipal
		supply
5-7	<b>REVISION &amp; ASSESSMENT</b>	OF PAT
8-10	FINAL EXAMINATIONS	

## The following is an example of a Programme of Assessment for Grade 11

ASSESSMENT TASKS	TERM	TERM	TERM	TERM	% OF FINAL
	1	2	3	4	PROMOTION MARK
					_
Tests	1		1		5
Mid-year examination		1			5
Only one of the following	1	1	1		15
must be done per term:					
practical tasks: simulations/					
investigations/ research/					
assignment/small projects					
End-of-year assessment	Written examination		1	50	
	Practical	Assessment Task		1	25

Week	Topic	Content
1	SAFETY & PAT	Application and regulation of the OHS act pertaining to: clothing, head protection, eye and ear protection, footwear. Application and regulation of the OHS Act pertaining to: hand tools, power tools, construction machinery, workplace and safe site working methods. Safe site planning and organisation pertaining to: excavations, handling of materials, floors and stairs with open sides, builders' hoist and ladders
	MATERIALS	The sustainability of materials according to their appropriate use and nature. Preservation, painting, curing, electroplating, powder coating and galvanising of wood, metal, concrete and plastic
2	EQUIPMENT	Use, care and setting up of the dumpy level to determine datum point, slopes and distances Hand and power tools used in the construction processes of roof trusses: <b>Hand tools:</b> steel tape measure, building line, chalk line, steel square (builders), spirit level and transparent pipe level <b>Woodwork tools:</b> try and mitre squares, sliding bevel, rip saw, cross cut saw, cross pene and claw hammer <b>Power tools:</b> portable electric circular saw, angle grinder and portable electric plane <b>Construction machinery</b> : generator (electricity supply) and electric mitre saw
3	GRAPHICS/ COMMUNICATION	Advanced freehand sketching Instrument drawings involving: orthographic projection with sections Different elevations of a building. Vertical sections indicating labelling and dimensions to SANS specification for building drawings
4	GRAPHICS/ COMMUNICATION	Drawing of house plans for dwellings with gable roof, hipped roof with valleys, lean-to roof, flat roof and roofs with parapet walls including: floor plan, drainage plan, site plan, elevations and the ability to develop drawings from specifications and descriptive notes. CAD and electronic media
5	APPLIED MECHANICS	Determine graphically the nature and magnitude for the different members in force diagrams of roof frames and structures (only vertical loads) Calculations and graphic presentations (where possible) regarding beams: Reactions at the supports, uniform distributed loads and point loads, shear forces and bending moments, calculations and diagrams of shear force and bending moments. Using correct units and terminology
6	APPLIED MECHANICS	The modulus of elasticity stress and strain of materials (manipulation of formulae). Calculation of centroids and centre of gravity (irregular shapes).(Supply formulae sheet to learners)
7	CONSTRUCTION: PILING CONCRETE	Piling: purpose, positioning, how, when and where used Ready mixed concrete: mix proportions of concrete (low, medium and high strength). Components of concrete. Difference between mass and reinforced concrete. Transport, placing, levelling, compacting and curing. Setting times and Admixtures. Tests on concrete and the purpose of each: slump and cube test
	RIB AND BLOCK FLOOR	Sketches, advantages, installation method, precaution before and after installation of rib and block / block and beam construction (or similar technique) for multi-storey floor slabs and roofs
8	Construction: Reinforcing Formwork	Reinforcing in concrete for: floors, beams, cantilever beams and columns Materials and compliance requirements for materials used for reinforcing. Show sectional views only. Minimum concrete cover Formwork: form oils and emulsions, and defects that can occur in concrete due to shuttering
9	CONSTRUCTION: DRYWALL CONSTRUCTION	Materials, advantages, disadvantages, methods of finish and installation methods of dry wall construction for dry and wet conditions

10	CONSTRUCTION: BRICKWORK	Construction of sub and superstructure from floor to roof using: half brick wall, one brick wall and one and a half brick wall (walls and columns)
10-11	REVISION AND END Collection of design	-OF-TERM TEST portfolios of PAT from learners

Week	Topic	Content
1	CONSTRUCTION:	Alternate plan courses of T-junctions and corners built in Stretcher bond and English bond
	BRICKWORK	Constructional details, purpose, advantages and disadvantages of beam filling. Cavity walls:
		sketches, constructional details, purpose, advantages and disadvantages. Purpose,
		constructional details, advantages, disadvantages and support during construction of semi-
		circular and flat arches. Differentiation between rough arches and gauged arches
2	CONSTRUCTION:	Purpose, location, material and installation of cladding on walls using natural and artificial
	CLADDING	stonework.
		Positioning, properties and types of materials used for damp course in basements, walls, floors
	WATERPROOFING	and roofs
3	CONSTRUCTION:	Materials, equipment, erection, dismantling, scaffolding and regulations associated with
-	FORMWORK	formwork for beams, cantilever beams, columns, stairs, floors and arches.
	EXCAVATIONS	Underpinning: sketches, how, when and where to use
		Types of wood; hard and soft wood (SA Pine, Saligna and Meranti) as used in construction
	WOODWORKING	
4	CONSTRUCTION:	Position, composition and purpose of cover strips, brandering, ceilings, cornice, skirtings and
	WOODWORKING	roof timbers
		Layout, installation, calculation of materials, different types of ceilings and finishing to ceilings
		Doors and windows: (use of catalogues to select doors and windows)
		Purpose, need, materials and methods of application of preservatives for timber
		Layout of roof trusses on gable and hipped roofs
5	CONSTRUCTION:	Roof trusses: couple roof, King post truss, SA or Howe truss, W truss, lean-to truss and lean-to
	WOODWORKING	frame with open and closed eaves and sectional views
		Basic roof design as seen from above and in elevations (gable roof, hipped roof with valleys;
		lean-to roof and flat roof, including roofs with parapet walls.
		Developing cutting lists for trusses, doors and cabinets
6	CONSTRUCTION:	Use of columns and structural beams, e.g. I-beam, H-beam, U-channel, lip-channel and angle-
	STEEL	iron.
		Layout of steel trusses and purlins
		Principles of determining shapes of gusset plates for steel structures and the different methods
		(bolts and nuts, rivets and welding) of keeping the members together are discussed
7	CONSTRUCTION:	Regulations, purpose, methods of installation, spacing of roof trusses and spacing of purlins /
		battens for particular types of roof coverings.
	ROOF COVERING	Properties, composition, advantages and disadvantages of: concrete roof tiles, thatch, IBR,
		and corrugated iron sheeting
8 - 10	MID-YEAR EXAMINATI	ONS & collection of drawings for PAT from learners

Week	Topic	Content
1	CONSTRUCTION:	Plastering: different finishes. Tiling: floors and walls
	FINISHING	Painting: Interior, exterior and different applications. Covering of plumbing, electrical and drainage pipes by chasing into wall or floor and covering with plaster, tiles or other appropriate material. Modern methods of finishing walls, roofs and floors
2	CONSTRUCTION: CABINET MAKING TECHNICAL ADVANCES	Manufacturing process of cabinet making for a large project such as built-in cupboards and kitchen cupboards giving attention to: choice of materials, cutting list, construction method, finishing and fitting of the project. Properties and use of new materials and new construction techniques taking into account regulations
3	CIVIL SERVICES:	Cold water supply and distribution. Where used, advantages and disadvantages and working principles of other water supplies such as: boreholes and shallow wells. Desalination: the methods, advantages and disadvantages of desalination
	COLD WATER SUPPLY	Basic plumbing in a house including: fittings, distribution and placement of pipes (surface or chased). Types of pipes used for hot and cold water supply
4	CIVIL SERVICES:	Types of pipes used for hot and cold water supply. Working principles of geyser installed horizontally and vertically.
	HOT WATER SUPPLY	Types, installation, advantages, disadvantages and working principles of solar geysers and other water heaters. Purpose of pressure reducing valves
5	CIVIL SERVICES:	Differentiation between sewage and sewerage, differentiation between soil water and waste water, ventilation system, soil vent pipes, water traps and gulley, regulations governing drainage, abbreviations used in drainage systems. Properties, advantages and disadvantages of materials used in a drainage system: PVC pipes and fittings and cast iron pipes.
	SEWERAGE	Line diagram of the layout of a drainage plan for a simple single-storey dwelling, up to the connection point of the local authority taking into account abbreviations, gradient, regulations and drainage principles.
		The calculation of invert levels at the top and bottom of drains. The following must be considered: regulations, colour coding and sectional view (identification of different components). Reasons for installing, advantages, disadvantages, purpose and functioning of conservancy tank, septic tank and French drains
6	CIVIL SERVICES:	The regulations and methods of disposing of large quantities of water from a site to the municipal storm-water system. Methods of chanelling storm-water from municipal manholes to
	STORM-WATER	run-offs, catchments, dams and rivers Identification and interpretation of basic electrical symbols which are to be used in the drawing of a basic electrical layout for a building.
	ELECTRICAL SYSTEM	The installation and location of : meter box, distribution box, card supply (prepaid) and conduits. The alternative sources of electricity supply: where to use, advantages and disadvantages, and working principles: solar, hydro, wind and nuclear
7-10	TRIAL EXAMINATIONS, C	OLLECTIONS & ASSESSMENT OF PROJECTS FOR PAT

Week	Topic	Content
1	QUANTITIES	Calculating quantities of materials for a small house by applying basic mathematical formulae.
		Costing for a project such as a small house (compare prices from different suppliers)
2	JOINING:	Joining bricks to roof trusses.
	BRICKWORK	Methods of joining gusset plates to members of steel roof truss. Joining concrete to steel e.g.
	STEEL	flanges, gusset plates. Methods of joining steel columns to roof trusses. Special precautions when
		joining dissimilar metals taking into account expansion and contraction rates of varying materials
		and bonding agents
3	JOINING:	Bolts, screws, nails, gang nails, roof wire, hoop iron (galvanised strap).
	WOOD	Joining of pipes for cold water supply from municipal supply to sanitary fixtures and geysers.
	PLUMBING/ PIPES	Material used and joining methods: capillary joint and compression joints. Materials used and joining
		methods: thread joints, PVC weld, flanges
4-10	REVISION AND END-	OF-YEAR EXAMINATIONS

## The following is an example of a Programme of Assessment for Grade 12

ASSESSMENT TASKS	TERM	TERM	TERM	TERM	% OF FINAL
	1	2	3	4	PROMOTION MARK
Taata	1		1		E
Tests	I		I		5
Mid-year and trial		1	1		10
examination					
Only one of the following	1	1			10
must be done per term:					
practical tasks: simulations/					
investigations/ research/					
assignment/small projects					
End-of-year assessment	Written e	xamination		1	50
	Practical	Assessment	1		25
	Task				

### **SECTION 4**

#### 4. ANNUAL ASSESSMENT REQUIREMENTS

## 4.1 ANNUAL ASSESSMENT REQUIREMENTS FOR GRADE 10

The following are the minimum tasks that must be completed in each term. Additional exercises can be given to the learners.

ASSESSMENT TASKS	TERM	TERM	TERM	TERM	% OF FINAL
	1	2	3	4	PROMOTION MARK
Tests	1		1		5
Mid-year examination		1			5
Only one of the following	1	1	1		15
must be done per term:					
practical tasks: simulations/					
investigations/ research/					
assignment/small projects					
End-of-year assessment	Written ex	xamination		1	50
	Practical	Assessment Task		1	25

#### 4.2 ANNUAL ASSESSMENT REQUIREMENTS FOR GRADE 11

The following are the minimum tasks that must be completed in each term. Additional exercises can be given to the learners.

ASSESSMENT TASKS	TERM	TERM	TERM	TERM	% OF FINAL
	1	2	3	4	PROMOTION MARK
Tests	1		1		5
Mid-year examination		1			5
Only one of the following	1	1	1		15
must be done per term:					
practical tasks: simulations/					
investigations/ research/					
assignment/small projects					
End-of-year assessment	Written examination			1	50
	Practical Assessment Task			1	25

## 4.3 ANNUAL ASSESSMENT REQUIREMENTS FOR GRADE 12

The following are the minimum tasks that must be completed in each term. Additional exercises can be given to the learners.

ASSESSMENT TASKS	TERM	TERM	TERM	TERM	% OF FINAL
	1	2	3	4	PROMOTION MARK
Tests	1		1		5
Mid-year and trial		1	1		10
examination					
Only one of the following	1	1			10
must be done per term:					
practical tasks: simulations/					
investigations/ research/					
assignment/small projects					
End-of-year assessment	Written examination Practical Assessment			1	50
			1		25
	Task				