education

Department:
Education
REPUBLIC OF SOUTH AFRICA

CIVIL TECHNOLOGY

EXAMINATION GUIDELINES

GRADE 12

2009

This guideline consists of 8 pages.

1. Introduction:

The purpose of these guidelines is to assist teachers and learners in their preparation for the National Senior Certificate (NSC) examination for Civil Technology.

These guidelines should be used in conjunction with the following documents

1. The National Curriculum Statement (NCS)
2. The content framework in the Learning Program Guidelines (LPGs) dated January 2008
3. The Subject Assessment Guidelines (SAGs) dated January 2008

2. Content to be covered:

The following table provides an elaboration of the content to be covered
Refer to the LPG for Civil Technology for further details on content:

ASPECT	CONTENT	ELABORATION
Construction processes for sub-structure and super-structure	Safety	As applicable on site, workshop and any working environment. Handling and storage of material, hand and power tools, specialized tools and equipment. Erection of frames such as scaffolds & ladders. Personal safety and safety equipment for personal protection
	Joining – steel	Roof trusses to columns. Gusset plates – (methods used to connect gasset plates to steel members). Flanges.
	Joining – wood	Butt joint; mortice and tenon joints (haunched mortice and tenon joints, haunched double mortice and tenon joints, barefaced mortice and tenon joints); tongue and groove joints; lapped joints (corner, tee); housing joint and corner joints for cabinets.

		Gangnail roof trusses. Grading of wood. Layout of a roof truss, types, cutting list. Properties, uses, advantages and disadvantages of adhesives, nails, screws and paints.
	Brickwork	Brickwork – reinforcement, damp-proofing, bonds (English, stretcher, cross junction, quoin & T - junction). Arches – types, purpose, materials used, purpose of supports for arch (centres – small span), different arches (parts & purpose of the parts). Stonework – artificial, natural. Sundry items – durability, uses, advantages and disadvantages of adhesives, nails and screws

Advanced construction	Safety, material, equipment and joining	Formwork: purpose, material used, erecting and dismantling, preparation of forms before and after casting. Defects in concrete due to formwork. Formwork for concrete staircase, beams, columns, floors. Types of formwork Reinforcing of columns, beams, floors, foundations, lintels (including materials, properties), slabs (multi-storey buildings) and concrete roofs. Scaffolding – regulations, types and safety.

		Types of foundations – when & where they are used (Pile, Raft foundations, Underpinning), strip foundations. Slabs – rib & block, block & beam (multi-storey buildings) In-situ concrete slabs Ready mixed concrete – when & why it is used. Advantages and disadvantages. Details of dry wall construction. Materials, construction methods, properties, advantages and disadvantages. Steel frameworks used in the construction industry – laying, joining, parts & members – Identification & purpose, purpose & connection methods of gusset plates, fasteners (eg.rivets, nuts and bolts, welding). Structural steel sections (cross sections), freehand drawings and identification. Concrete bases – fixing of steel columns to concrete basis
	Technical advances	New materials, construction methods, regulations.
	Waterproofing	Basements, roofs, windows and walls.

Civil services	Water supply	Hot and cold water supply. Working principles of hot water systems – electrical, solar. Sources of water supply – boreholes, shallow wells, desalination.
	Joining pipes	Threaded joints, PVC weld, flanges, compression joint, capillary joints.

		Materials used.
	Sewerage	Traps (P-trap, S-trap, Grease trap, Bottle trap, resealing trap.) – purpose, qualities, features, manufacturing materials. Layout for drainage of a building. Above & below ground level – ventilation, siphoning, slopes, regulations, properties of good drainage system. Septic tank; French drain; conservancy tank – purpose and operation, where and when used. Materials used in drainage systems.
	Stormwater	Advantages and disadvantages of different systems of waste disposal. Disposal and collection.
	Electrical	Alternative sources of electricity – solar, hydro and nuclear, wind.

Materials and Quantities	Materials	Sustainability – use, durability e.g. timber, metals, concrete, blocks & brickwork, glass (uses), plastic, preservatives & care. Testing – concrete, bricks & sand, proportion of aggregates. Slump and cube test. Extracting quantities of materials for a small house – brickwork, concrete, roofing material (spacing of trusses, purlins, battens), tiles, excavation, plaster. Basic mathematical calculations such as area and volume

		Cabinet construction – materials used, cutting list, choice of materials, construction methods, finishing, fitting the project (built-in, bathroom cabinets, kitchen cupboards). Costing of small projects.
Applied mechanics		Graphical representation of force diagrams for frameworks & structures (only vertical loads) Beams as indicated in the defining content section of LPG including uniformly distributed loads – units & terminology. Modulus of elasticity – stress & strain. Calculations and theory. Centre of gravity – centroids, lamina's.
Graphics & communication	Drawing	Elevations, site plans & floor plans, vertical sections through a building, labelling, dimensioning according to SANS, descriptive notes. Design of a simple rectangular single-storey dwelling. Design of roofs (Top view) of roofs as listed below – Types of roofs (flat roof, lean-to roof, gable roof, hipped roof – including parapet walls). Drainage layout drawing (line diagram only).

- **Teachers must pay special attention to learners' ability to produce drawings or diagrams from a text description.**

- **Teachers must ensure that they become computer literate as it is not possible to engage in CAD without the basic computer skills. Educators must start to familiarize themselves as well as the learners with the basic principles of CAD.**

- **Teachers must be aware that some of the Grade 10 and Grade 11 content may be assessed in Grade 12 as it forms the basis of the subject.**

- **THIS DOCUMENT SHOULD BE USED AS A <u>GUIDE ONLY</u> AND NOT AS A WORK SCHEDULE.**

REFERENCE MATERIAL THAT MAY BE USED

NO.	NAME OF THE BOOK	AUTHOR	PUBLISHER/ISBN NO.
1.	BRICKWORK 2 (NEW EDITION)	W.G. NASH	0 09 150371X
2.	BRICKWORK 3 (NEW EDITION)	W.G. NASH	0 09 150381 7
3.	BRICKLAYING & PLASTERING THEORY N1	F.W. KRAUKAMP	1 86813 089 4
4.	BUILDING CONSTRUCTION & GRAPHIC STANDARDS	ANDRE' GROBBERLAAR	0620 07787 5
5.	BUILDING SCIENCE N1	C.L. MOOLMAN	
6.	BUILDING SCIENCE N2	I.J.W. GRUSSENDORFF & J.C. DU PISANIE	0 07 450743-5
7.	BUILDING AND CIVIL TECHNOLOGY N3	CHRIS DE JAGER	0-636-04178-6
8.	MOTIVATE SERIES	D. WALTON	0 333-60522-5
9.	CONSTRUCTION TECHNOLOGY VOLUME 1	R. CHUDLEY	LONGMAN
10.	CONSTRUCTION TECHNOLOGY VOLUME 2	R. CHUDLEY	LONGMAN
11.	TEACHER'S NOTES	Compiled by Dr. F. van As	
12.	PLUMBING, DRAINAGE AND SHEET METALWORK	H.J. HARRIS	0 636 01148 8
13.	PLUMBING AND MECHANICAL SERIES 1	A.H. MASTERMAN AND R.M. BOYCE	0 7487 0368 3
14.	PLUMBING AND MECHANICAL SERIES 3	A.H. MASTERMAN AND R.M. BOYCE	0 7487 0233 4