ZIMBABWE

MINISTRY OF PRIMARY AND SECONDARY EDUCATION

BUILDING TECHNOLOGY AND DESIGN SYLLABUS

FORMS 1 - 4

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CONTENTS

1.0 PREAMBLE

1.1 Introduction

This Building Technology and Design syllabus is designed for Forms 1 - 4 learners. Both theory and practice will be at the center of implementing this syllabus. The syllabus ensures access to learning and teaching Building Technology and Design regardless of gender and learners' diverse needs.

The syllabus promotes learners' development of psychomotor skills and techniques and ensures that learners develop socially, physically, emotionally and cognitively. It serves as a firm foundation for self-reliance, entry into the construction industry, further studies and training in Building Technology and Design.

1.2 Rationale

The philosophy of the Zimbabwean Constitution provides for decent housing and shelter for all which makes it necessary for the learning and teaching of Building Technology and Design in schools. This course encourages learners to employ problem solving skills which promote the application of scientific and technological knowledge. The learning areas will enable learners to appreciate the dignity of labour, integrity, unhu/Ubuntu and patriotism. It is therefore imperative that the learners are afforded an opportunity to study this learning area as they pursue their education and prepare for future careers and entrepreneurial activities.

1.3 Summary of Content (Knowledge, Skills and Attitudes)

This syllabus will cover theory and practical activities in areas such as design and drawing, material science, use and care of building tools and equipment, construction processes, estimations, application of by-laws, health and safety issues. Learners will be engaged in community development projects, infrastructure maintenance and attachment to construction industry.

1.4 Methodology and Time Allocation

Suggested Methods

The syllabus is based upon interactive, learner centred, multi -sensory and hands on approaches. Principles of individualization, concreteness totality and wholeness and simulation must be applied to enhance the suggested teaching methods. These approaches and principles encourage curiosity and promote practical orientated learning whereby learners apply their experiences, knowledge, skills and attitudes independently. Linkage between theory and practice is strongly recommended in the learning and teaching of Building Technology and Design. The following are suggested methods:

1.4.1 Case study
1.4.2 Discussions
1.4.3 Project based learning
1.4.4 Educational tours
1.4.5 E-learning
1.4.6 Experimentation
1.4.7 Individualisation
1.4.8 Problem solving
1.4.9 Discovery method
1.4.10 Demonstrations
1.4.11 Survey
1.4.12 Visual tactile
1.4.13 Gallery walk
1.4.14 Resource person(s)
1.4.15 School on the shop floor
1.4.16 Group work

Time Allocation

Eight periods of 35 - 40 minutes per week should be allocated for adequate mastery of competencies.

1.5 Assumptions

The syllabus assumes that learners have:

- drawing and measuring skills
- knowledge of some building tools and materials
- knowledge of different building designs
- information communication technology
- numeracy and scientific skills
- engaged in cooperative work and self-assessment activities

1.6 Cross-cutting themes

In order to foster competency development in the learner, the following cross-cutting issues have to be taken into consideration:

- Gender
- Children's Rights and responsibilities
- Life Skills
- Disaster Risk Management
- Information Communication Technology tools
- Child Protection

- Collaboration and Environmental Issues
- Environmental Issues
- Heritage

2.0 PRESENTATION OF THE SYLLABUS

The Building Technology and Design syllabus is a single document covering Form 1 to 4. It contains the Preamble, Aims, Objectives, Syllabus Topics, Methodology, Time Allocation, Scope and Sequence, Competency Matrix and Assessment. The Scope and Sequence Chart shows progression of topics from Form 1 to 4, while the syllabus matrix gives details of the content to be covered and a list of suggested notes and resources to be used during learning and teaching.

3.0 AIMS

The syllabus aims to help learners to:

3.1. appreciate the importance of Building Technology and Design for sustainable socio- economic development of the country
3.2. acquire knowledge, skills and attitudes which will enable them to effectively and efficiently execute construction activities
3.3. understand principles of occupational health and safety in the construction industry
3.4. acquire a scientific knowledge of building materials and their utilisation in a sustainable manner
3.5. appreciate the appropriate use and care of tools and equipment to produce desired results
3.6. acquire and develop psychomotor skills
3.7. acquire an in-depth comprehension of the main concepts in the production and interpretation of building drawings
3.8. acquire knowledge of costing buildings
3.9. understand trades and professions within the construction industry
3.10. research and utilise indigenous construction technologies and materials

4.0 SYLLABUS OBJECTIVES

Learners should be able to:

4.1. identify operatives, tradesmen and professionals in the construction industry
4.2. apply knowledge of safety and health precautions when working on a building site
4.3. choose appropriate tools, equipment and materials for a specific task
4.4. determine suitable sites for buildings
4.5. demonstrate trade and technical skills
4.6. interpret information given on building drawings
4.7. design and construct single storey structures
4.8. use ICT skills in building drawing and design
4.9. calculate quantities and cost buildings with the use of ICT or mechanically
4.10. explain the importance of building technology to the socio-economic development of the country
4.11. analyse the properties of building materials
4.12. demonstrate an understanding of designing and building as an enterprise
4.13. use indigenous construction technologies and materials in a sustainable manner to design and construct structures
4.14. demonstrate patriotism through community development projects
4.15. apply building regulations (by-laws) in design and construction

5.0 TOPICS

5.1 Building Technology
5.2 Health and Safety
5.3 Building Tools and Equipment
5.4 Materials
5.5 Bonding
5.6 Site Works
5.7 Sub Structure
5.8 Super Structure
5.9 Design and Drawing
5.10 Quantities
5.11 Finishes
5.12 Services

6.0 SCOPE AND SEQUENCE

TOPIC	FORM 1	FORM 2	FORM 3	FORM 4
6.1 Building Technology	• Introduction to building as a learning area • Importance of shelter • Careers in the construction industry	• Indigenous technology • Building as an enterprise	• Structure of the construction industry • Contracts and tendering procedures • Building as an enterprise	• Contracts and tendering procedures • Building as an enterprise
6.2 Health and Safety	• Common accidents in workshops and construction sites • Causes of accidents • Prevention of accidents • Protective clothing • Application of First Aid	• Safety on construction sites • Application of First Aid	• Regulations and Acts governing safety and health at work • Safety on scaffolds and ladders • Application of First Aid	• Personnel involved in safety and health in the workplace • Handling of hazardous substances • Application of First Aid
6.3 Building Tools and Equipment	• Hand tools • Care of tools and storage • Classification and maintenance of hand tools	• Scaffolding and safety	• Introduction to building equipment • Use, service and maintenance of building equipment • Care of equipment • Designs of storage shelves and	• Servicing and maintenance of scaffolds and ladders
6.4 Building Materials	• Materials used in the construction industry • Indigenous and modern building materials • Conservation of the environment	• Quality of materials • Storage of materials	• Science of building materials • Conservation of the environment	
6.5 Bonding	• Half brick (115mm) and one brick (230mm) walls • Types of bonds	• Combination of bonds	• Bond solving	• Bond solving
6.6 Design and Drawing	• Drawing and design equipment • Geometrical drawing • Computer aided design and drawing	• Computer aided design and drawing • Geometrical drawing	• Computer aided design and drawing • Pictorial and orthographic projections of single storey buildings	• Design project

TOPIC	FORM 1	FORM 2	FORM 3	FORM 4
6.7 Site Works	• Preliminary site works	• Environmental conservation and safety • Setting out	• Site operations • Building by- laws • Environmental conservation and safety	• Setting out instruments
6.8 Substructure	• Foundations • Environmental conservation and safety	• By- laws on foundations • Environmental conservation and safety	• Types of foundations	• Wall positioning on foundations
6.9 Floors		• Types of floors • Indigenous and modern floor finishes	• Types of floors • Indigenous and modern floor finishes	• Land scaping
6.10 Super Structure	• Walls • Wall openings • Wall finishes • Scaffolds • Roofs	• Types of walls • Position of openings • Spanning of openings • Coping, pointing and jointing • Roofs and roof coverings	• Forces on walls • Strengthening and stabilizing walls • Fixing of frames to openings • Tiling, cladding and wall papering • Design and construction of roofs • Ceilings	• Prefabricated walls • garden walls • Retaining walls • Fixing of frames to openings • Window sills, thresholds and stairs • Plastering and painting
6.11 Quantities	• Areas and volumes	• Quantities of materials for a given structure	• Sub structure bill of quantities	• Bill of Quantities of structures
6.12 Services 6.12.1 Electricity	• Sources of electricity • Safety when working with electricity	• Safety when working with electricity • Wiring	• Down transformers • Wiring • Resistance • Circuit breakers • Current reduction (voltage Drop) • Movement of electricity from the source • House installation	• Renewable energy

FORM 1

7.0 COMPETENCY MATRIX

7.1 TOPIC 1: BUILDING TECHNOLOGY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.1.1 Building Technology and Design as a subject	• explain the term building technology • identify the importance of shelter • state building types and designs found in Zimbabwe • appraise the aesthetic value of existing buildings • describe historical development of human habitats	• Importance of Shelter - Types of shelter - Design, construction and maintenance of buildings - Historical perspective of human habitats in Zimbabwe • Building as an enterprise	• Conducting educational tours • Observing existing buildings • Listing types of building designs • Discussing aesthetic value of existing buildings • Sketching different types of shelter • Discussing the importance of shelter in a community • Comparing historical development of human habitats	• ICT tools • Recommended textbooks • Resource person • Buildings in the surrounding community • Print media • Historical monuments e.g.Great Zimbabwe, Khami ruins • Drawing materials • Cardboxes
7.1.2 Careers in Building Industry	• identify careers in the building industry • practice skills related to building trades	• Trades: - Carpentry - Brick laying - Plumbing - Electrical installation - Plastering - Painting • Professions:	• Listing the duties of trade persons and professionals • Practicing skills related to building trades	• ICT tools • Recommended textbooks • Resource person (s) • Buildings in the surrounding community • Print media • Drawing materials • Cardboard

7.1 TOPIC 1: BUILDING TECHNOLOGY CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
		- Architecture - Quantity surveying - Structural engineering - Civil engineering		

7.2 TOPIC 2: HEALTH AND SAFETY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.2.1 Causes of Accidents at building sites	• identify causes of accidents at building sites • perform fire drills periodically	• Causes of accidents at building sites such as: fall, defective tools, horse play, carelessness, slippery floors, long sleeves • Emergency call for help • Fire drills	• Identifying causes of accidents at the construction sites • Listing accidents that may occur at construction sites • Demonstrating emergency call and fire drills • Performing mock fire drills	• Reports and statistics on accidents • Recommended textbooks and materials
7.2.2 Methods of Accidents Prevention at Construction Sites	• describe methods of accidents prevention at construction sites • carryout awareness campaigns in and outside the school	• Sensitization on accident regulations - Prevention methods: - Site working rules - Inspection of tools - and equipment prior to work • Safe health practices (HIV Aids and other diseases)	• Discussing methods of accident prevention and self-health practices • Identifying appropriate protective clothing for given tasks • Designing awareness campaign materials • Campaigning in and outside the school	• First Aid Kits • Stretcher beds • Resource persons • Placards • Posters • Flyers

7.2 TOPIC 2: HEALTH AND SAFETY CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.2.3 First Aid Equipment at work Sites	• identify First Aid equipment and materials at work sites • outline procedures to be taken for treatment of an accident victim • perform first aid procedures	• First Aid equipment • First Aid procedures	• Identification of First Aid equipment at work places • Role play of accident scene	• First Aid kit • Stretcher beds • Resource persons

7.3 TOPIC 2: TPPLS AND EQUIPMENT

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.3.1 Hand Tools	• identify hand tools • classify tools according to uses	• Tools: - mortar - alignment and measuring - digging - cutting	• Discussing and classifying tools according to their use • Demonstrating, handling and use of tools	• Recommended textbooks • Tool rooms • Charts • ICT
7.3.2 Preventive Maintenance	• clean tools after use • store tools after use	• Care and storage	• Explaining and demonstrating cleaning and storage of various tools - Oiling - Greasing	• Recommended textbooks • Tool rooms • Charts • ICT tools

7.4 TOPIC 4: BUILDING MATERIALS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.4.1 Materials used in the Building Industry	• identify building materials used in the conventional and indigenous technologies	• Modern building materials: - Bricks - Cement - Mortar - Concrete - River sand - Pit sand - Timber - Steel • Indigenous materials: - Grass - Timber - Bamboo - Earth - Stone	• Classifying building materials • Discussing ways of improving strength of materials	• Samples of materials such as pit sand, river sand, cement, clean water • Recommended textbooks • Charts • ICT tools
	• use matrix, fine and coarse aggregates to make mortar and concrete • reduce environmental damage on sites	• Mortar and concrete • Environmental conservation and safety	• Observing building materials using gallery walk and site visits • Demonstrating mixing of mortar and concrete • Demonstrating sustainable environmental conservation measures	• Samples of materials such as pit sand, river sand, cement, clean water • Recommended textbooks • Charts • ICT tools

7.5 TOPIC 5: BONDING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.5.1 Half brick (115mm) and one brick (230mm) walls	• define bonding • state types of bonds • apply rules and regulations of bonding • draw plans and elevations of walls	• Brickwork bonds - Stretcher - Header - English • Rules and regulations of bonding • Plans and elevations of bonds	• Defining bonds • Applying rules and regulations of bonding • Drawing plans and elevations of bonds	• Print media • ICT tools • Bricks • Recommended text • Drawing equipment • Existing walls

7.6 TOPIC 6: DESIGN AND DRAWING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.6 Design and Drawing	• identify drawing and design equipment	• Drawing and design equipment: - drawing board - set squares - protractor - pair of compass - ruler	• Listing the drawing equipment • Stating the uses of equipment	• Recommended textbooks • Charts • Drawing equipment and material • Existing building structures • ICT tools
	• construct angles and shapes using geometrical instruments	• Geometrical construction of angles and shapes	• constructing different angles and shapes	
	• apply ICT skills in design and drawing	• Computer aided design and drawing	• Computer aided drawing	

7.7 TOPIC 7: SITE WORKS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.7.1 Preliminary Site Work	• select a suitable site for a building	• Factors influencing site selection • Environmental conservation issues - preservation of trees outside the established site - Wet lands	• Listing factors that influence choice of a site • Surveying land	• Tools and plant equipment • School sites • Recommended textbooks • Charts • ICT tools
	• Clear construction site	• Site clearance such as removal of trees, grass	• Clearing construction site	• School sites • Recommended textbooks • Charts • ICT tools •

7.8 TOPIC 8: SUB STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.8.1 Foundations	• define foundation • name types of foundations • state importance of foundations • give two ways of excavating trenches • explain safety measures to be taken when excavating trenches • justify reasons for environmental conservation	• Foundations • Manual and mechanical means of excavating trenches • Prevention of accidents at excavated sites • Methods of environmental conservation	• Defining the term foundation • Explaining the purpose of foundations • Describing the types of foundations • Discussing methods of excavating trenches • Describing measures taken to prevent accidents on excavated sites • Discussing methods of conserving the environment	• ICT • Hand digging tools • Timber • Cutting saws • Resource person from industry • Recommended textbooks

7.10 TOPIC 10: SUPER STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.10.1 Walls	• define terms associated with walls • explain functions and importance of walls	• Functions and importance of walls	• Defining terms associated with wall construction • Explaining functions and importance of walls	• Recommended textbooks • Print media • ICT tools • Drawings • Existing structures
7.10.2 Wall Openings	• explain the functions of wall openings on a building • build wall openings	• Wall openings: - Doors - Windows - Air vents - Permavents • Position of wall openings	• Explaining the purpose of wall openings • Constructing wall openings such as: door, window and air vent openings within the school/community	• Recommended textbooks • Print media • ICT tools • Drawings • Existing buildings
7.10.3 Wall Finishes	• define wall finish • identify indigenous and modern wall finishes outline the importance of wall finishes	• Definition of wall finishes • Indigenous wall finishes: - Stone masonry - Rammed earth - Bamboo/ reeds • Modern wall finishes: - Plastering - Painting	• Defining terms • Listing indigenous and modern wall finishes	• ICT tools • Recommended textbooks • Researched documents • Existing buildings • Print media • Resource person

7.10 TOPIC 10: SUPER STRUCTURE CONTD...

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
		- Cladding - Tiling - Rough casting - Wall papering • Importance of wall finishes	• Discussing the importance of wall finishes • Observing existing structures	
7.10.4 Roofs	• define a roof • state the functions of roofs	• Definition of a roof • Functions of a roof	• Defining the term roof • Discussing the functions of roofs	• ICT • Research documents • Existing buildings • Print Media

7.11 TOPIC 11: QUANTITIES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.10 Areas and Volumes	• identify different shapes on existing buildings • calculate areas of shapes and volumes of objects	• Shapes used on buildings: - Square - Triangle - Rectangle - Hexagon - Circles • areas and volumes of different shapes and forms	• listing and drawing common shapes on buildings • calculating areas and volumes	• Existing buildings • ICT • Recommended textbooks • Researched documents • Resource persons • measuring tapes

7.12 TOPIC 12: SERVICES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.12.1 Sources of Electricity	• state methods of electricity generation • illustrate methods of electricity generation	• Types of electrical sources - Hydro power - Thermal power - Fuel power - Solar power	• Describing the methods of generating electricity • Construct models of power generation • Conducting educational tours	• Cardboard boxes • Electrical wire • Electrical tools • ICT tools
7.12.2 Safety when working with electricity	• explain the risks associated with using electricity • apply first aid procedures	• Safety precautions - Safety clothing - Switch off switches (SOS) • First Aid	• Discussing the risks associated with using electricity • Demonstrating First Aid procedures	• First aid kit • Resource person • Print media • ICT tools

FORM 2

7.0 COMPETENCY MATRIX

7.1 TOPIC 1:BUILDING TECHNOLOGY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.1.1 Indigeneous Technology	• outline indigenous and modern building technologies • compare indigenous and modern technologies	• Indigenous technologies such as: - Dagga and pole structures - Thatching - Stone masonry • Modern technology such as: - Concrete walls and roofs - Brickwork - Processed timber - Metal sheeting	• demonstrating indigenous and modern technologies on buildings • Comparing indigenous and modern technologies in construction	• ICT tools • Resource persons • Buildings in the surrounding community • Print Media
7.1.2 Building as an Enterprise	• apply acquired skills for self-sustenance • create jobs in the building industry	• Building technology as an enterprise	• Appraising the benefits of studying Building Technology and Design • Implementing acquired skills of self – sustenance • Conducting educational tours	• ICT tools • Resource persons • Buildings in the surrounding community • Print media

7.2 TOPIC 2: HEALTH AND SAFETY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.2.1 Safety on Building Sites	• describe methods of accident prevention at construction sites • identify First Aid equipment at work sites • outline procedures to be taken for the treatment of an accident victim	• Prevention methods: - Sensitization on safety regulations - Site working rules - Inspection of tools and equipment prior to work • First Aid equipment • First Aid procedures	• Discussing methods of accidents prevention and safe health practices • Using First Aid equipment and procedures correctly • Role play of an accident scene	• Safety regulation pamphlets • Building model By- laws • ICT • Construction sites • First aid kit • Stretcher beds • Resource persons

7.3 TOPIC 3: TOOLS AND EQUIPMENT

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.3 Scaffolding	• assemble simple dependent and independent scaffolds	• Scaffolding: - Independent scaffold - Drums and boards - Trestles - Dependent putlog scaffold • Advantages and disadvantages of each type	• Erecting the different types of scaffolds	• Safety regulation pamphlets • Model Building by- laws • ICT • Construction sites • Scaffolds • Ladders
	• identify accidents that may occur when using scaffolds and ladders	• Common accidents using scaffolds and ladders	• Identifying accidents that are associated with the use of scaffolds and ladders	
	• describe methods of preventing accidents when using scaffolds and ladders	• Safety regulations governing the use of scaffolds and ladders	• Discussing regulations governing uses of	

7.3 TOPIC 3: TOOLS AND EQUIPMENT CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
	• describe methods of preventing accidents when using scaffolds and ladders		scaffolds and ladders • Visiting construction sites	

7.4 TOPIC 4: BUILDING MATERIALS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.4.1 Quality of Materials	• carry out tests for quality of materials	• Quality of materials: - River sand - Pit sand - Clean water - Cement - ¾ stones	• Carrying out tests for quality using both indigenous and scientific methods	• ICT tools • Resource persons • Materials • Print media • Construction sites
7.4.2 Storage of Materials	• demonstrate safe methods of storing materials on a construction site	• Storage of materials on site: - Bricks - Sand - ¾ stones - Cement	• Practicing proper storage of materials on site	• ICT tools • Resource persons • Materials • Print media • Construction sites

7.5 TOPIC 5: BONDING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.5.1 Combination of Bonds	• draw plans and elevations of walls in English, English	• Plans and elevations of walls	• Drawing plans and elevations of walls in stated bonds	• Print media • Existing walls

7.5 TOPIC 5: BONDING CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
	garden wall and Stretcher bonds			• Pictures of Great Zimbabwe • Drawing equipment
	• solve bonding problems up to one brick walls	• Bond solving: - Straight walls - T- junction walls - Return angle walls - Cross walls in Stretcher bond, English bond and English garden wall bond	• Solving bonding problems • Constructing walls in Stretcher bond, English bond and English garden wall bonds • Solving bonding problems at junctions and return angles	

7.6 TOPIC 6: DESIGN AND DRAWING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.6.1 Computer Aided Design and Drawing	• draw plans and elevations of given objects and structures	• Plans and elevations: - Brick - Walls - Corner block - Machine block - 2 roomed house	• Drawing plans and elevation of objects and structures	• ICT tools: (autoCAD, ArchiCAD) • Existing structures • Print media
7.6.2 Geometrical Drawing	• draw object and structure in pictorial views	• Pictorial views: - Isometric - Planometric - Oblique	• Drawing pictorial views	• ICT tools • Existing structures • Drawing equipment • Print media

7.7 TOPIC 7: SITE WORKS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.7.1 Setting Out	• list tools and equipment • interpret the plan • mark out and peg a rectangular and circular building	• Tools and equipment: - Tape measure, site square, builders line, lines and pins, hammer • Pegging - 3 :4: 5 and builders' square methods, diagonals, profiles, frontage line, trammel, line and peg method • Mark out	• Conducting educational tours • Establishing the site • Pegging the stand and house plan according to site plan • Practising setout rectangular and circular building • Erecting profiles	• ICT tools • Print media • Drawing plans • Profile tools

7.8 TOPIC 8: SUB STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.8.1 By-laws on Foundations	• determine the width and depth of a foundation trench • explain brick footing procedures	• By- laws on foundations: - Width and depth - Trial pit • Brick footing	• Deducing the width of a foundation trench of a given wall • Discussing factors that determine depth of a foundation • Sketching of brick footing with correct sequence and procedures • Demonstrating brick footing using the correct procedure	• ICT tools • Recommended textbooks • Model by- laws on building • Print media • Excavation equipment

7.8 TOPIC 8: SUB STRUCTURE CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.8.2 Environ mental Conservation and Safety	• explain how safety is ensured during and after excavation of trenches • describe safe methods of controlling termites • identify risks associated with use of chemicals	• Safety during and after excavation • Control of termites: - Methods - Chemicals	• Discussing methods of preventing animals and people from falling into excavated trenches • Discussing methods of termite control • Indicating risks of using chemicals on and the environment	• ICT tools • Model by- laws on building • Print media

7.9 TOPIC 9: FLOORS

EY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.7.3 Floors	• list types of floors • name floor finishes • distinguish between solid ground floor and suspended ground floor	• Types of floors: - Rammed earth - Solid ground floor - Suspended ground floor • Indigenous and modern floor finishes: - Rammed earth - Tiling - Parquet/ wood block - Cement sand screed - Terrazzo - Carpet	• Listing floor types • Discussing differences in floor types • Giving advantages and disadvantages of each type of floor finish • Describing how each type of floor is constructed • Constructing a rammed earth floor	• ICT tools • Print media • Rammers, hand compacter

7.10 TOPIC 10: SUPER STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.10.1 Types of Walls	• explain functions of different types of walls • differentiate between load and non-load bearing walls	• Types of walls: - External wall - Partition wall - Boundary wall - Screen wall - Parapet wall • Load and non-load bearing walls	• Explaining the types of walls • Illustrating the types of walls • Observing the types of walls on existing buildings • Discussing the importance between load and non- load bearing walls	• Recommended textbooks • Charts • ICT tools • Existing structures
7.10.2 Wall Openings	• identify the correct position of openings on walls • list materials used to bridge openings • explain the methods of bridging openings on a wall • cast different types of lintels and arches • fix door and window frames on a wall • draw sections and elevations of different wall openings	• Position of openings on buildings - Doors - Windows - permavents • Materials used to span openings: - Stone - Concrete - Timber - Bricks - Metal • Methods of spanning openings: - Brick on edge - Lintels (precast, cast- in -situ) - Arches	• Discussing position of openings • Listing materials used to bridge openings • Explaining the various methods of bridging openings • Constructing arches, lintels, sills and thresholds • Fixing door and window frames on walls	• ICT tools • Existing structures • Print media

7.10 TOPIC 10: SUPER STRUCTURE CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.10.3 Coping, Pointing and Jointing	• explain coping, pointing and jointing • give the importance of coping • state types of coping • analyse materials used for coping • demonstrate coping, pointing and jointing	• Coping - Types of coping - Materials for coping • Pointing and jointing • Methods of work	• Discussing various types of coping • Listing materials used for coping • Demonstrating pointing and jointing	• ICT tools • Existing structures • Measuring equipment
7.10.4 Roofs and Roof Coverings	• describe the types of roofs • identify roof coverings • sketch joints used to connect timber members on a roof • draw different types of roofs • construct a roof truss	• Types of roofs: - Gable roof - Flat roof - Lean- tool roof - heaped roof • Roof coverings: - Properties of roof coverings • Roof truss, wall plates and purlins	• Conducting educational tours • Discussing advantages and disadvantages of roof coverings • Making models of roof truss and roof covering	• Existing structures • ICT tools •

7.11 TOPIC 11: QUANTITIES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.11.0 Quantities of Building Materials on Existing Structures	• calculate the number of bricks in a given wall • calculate the volume of plastering mortar • calculate the volume of aggregates from given mixes	• Quantities of bricks • Volume: - Mortar - Concrete - Cement - Aggregates	• Calculating number of bricks in a given wall • Calculating volume of plastering mortar for a given surface • Calculating volume of cement, pit sand, river sand and stones from given mixes	• ICT tools • Existing structures • Measuring equipment • Print media

7.12 TOPIC 12: SERVICES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.12.1 Application of Electricity	• wire a three pin plug • apply safety precautions when using electricity	• Colour codes of electrical wires • The three pin plug • Safety when working with electricity	• Connecting wires to a three pin plug • Discussing safety precautions	• Resource persons • ICT tools • Electrical wires • Three pin plug • Electrical safety devices • Print Media
7.12.2 Dry and Wet Sewage Disposal System	• identify sewage disposal systems • position a ventilated pit latrine on a settlement • position the septic tank with regards to Buildings By- laws • draw plans, elevations and sections of the dry and wet systems of drainage	• Sewage disposal systems: - Ventilated - latrines • Water closets and septic tanks	• Demonstrating siting and construction of the ventilated pit latrine • Drawing of plans, elevations and sections of the dry and wet systems of drainage	• ICT tools • Existing structures • Resource persons • Drawing materials • Print Media

FORM 3

7.0 COMPETENCY MATRIX

7.1 TOPIC 1: BUILDING TECHNOLOGY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.1.1 Structure of the Construction Industry	• outline functions of professionals and trades persons in the parties involved • analyse the roles of professionals and trades persons	• Clients party • Contractors party • Statutory personnel	• Outlining the duties of professionals, trades persons, statutory personnel and operatives • Distinguishing roles of professionals and trades personnel	• Statutory instruments • Print media
7.1.2 Tender and Contract Documents	• explain the importance of contracts and tenders • outline tendering and contract procedures	• Tenders and contracts - Tendering - Tender documents - Types of tenders - Types of contracts - Contract documents	• Discussing the importance of tenders and contracts • Preparing tender and contract documents	• Tender and contract documents • Resource person • Print media •
7.1.3 Entrepreneurship Skills in Building Technology and Design	• Prepare a business proposal	• Entrepreneurship skills: - Project proposal -	• Writing a project proposal • Practicing business ethics	• Recommended textbooks • Print media • Financial institutions • Resource persons

7.2 TOPIC 2: HEALTH AND SAFETY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.2.1 Regulations and Acts Governing Health and Safety at Work	• exhibit an understanding of safety and health practices • practise good housekeeping on site • perform HIV awareness campaign	• Regulations and Acts governing health and safety at construction sites • Good housekeeping • Safe working conditions • HIV awareness	• Applying good housekeeping at the practicing ground • Conducting educational tours to construction sites • Performing HIV	• Regulatory Acts • ICT tools • Resource person • Print Media

7.2 TOPIC 2: HEALTH AND SAFETY CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.2.2 Safety on Scaffolds	• erect scaffolding and ladders in line with safety regulations	• Safety regulations governing the use of scaffolds and ladders	• Constructing independent, dependent scaffolding and ladders	• Ladders • Scaffolds • Safety regulation pamphlets • Building by-laws
7.2.3 Application of First Aid	• perform first aid procedures on site	• First aid equipment and procedures	• Role playing accident scene	• First Aid Kit • Resource person • Print media

7.2 TOPIC 2: HEALTH AND SAFETY CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.3.1 Introduction to Building Plant and Equipment	• classify the plant and equipment • explain appropriate use of plant and equipment in construction industry • describe servicing and maintenance of building equipment • design suitable storage for the equipment	• Building plant and equipment for: - Site clearance - Site levelling and excavation - Setting out • Service and maintenance of building plant and equipment • Storage of equipment	• Exploring construction sites • Researching on servicing and maintenance of building equipment • Design and drawing storage for building equipment	• ICT tools • Work sites • Print media • Drawing equipment • Servicing kit

7.4 TOPIC 4: MATERIALS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.4.1 Science of Building Materials	• carry out experiments • examine properties of building materials	• Properties of indigenous building materials:	• Carrying out experiments • Identifying different properties of materials • Conducting educational tours	• Different building materials • Laboratory • Zimbabwe ruins • Khami ruins
7.4.2 Conservation of the Environment	• observe the importance of natural resources to the community • analyse different methods of preserving the environment	• Importance of the natural environment resources • Effects of sourcing out materials to the environment • Methods of conservation	• Visiting virgin land • Identifying environmental affected areas in and around the school and community • Reclaiming eroded and degraded sites	• Rubble • Gravel • Broken bricks • Retaining walls

7.5 TOPIC 5: BONDING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.5.1 Bond Solving	• apply rules of bonding • demonstrate knowledge of bond solving in different types of bonds • bond solve half brick walls into one brick walls • construct walls in different types of bonds • draw plans and elevations of the walls	• Types of Bonds: - Stretcher - English - English garden wall - Header bond • Special Bonds: - Basket weave bond	• Defining broken bond • Applying rules and regulations of bonding • Drawing plans and elevations • Setting out and constructing straight, T junctions, cross walls and return angle walls	• Print media • ICT tools • Building materials and tools • Existing walls

7.6 TOPIC 6: DESIGN AND DRAWING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.6. Computer Aided Design and Drawing	• design building plans • draw plans and elevations of given structures • draw structures in pictorial views	• Working drawings - Site plan - Floor plan - Elevations - Cross section • Pictorial views: - Isometric - Planometric - Oblique	• Designing different structures • Developing site plan • Observing building lines • Drawing plans and elevation of structures • Drawing pictorial views	• ICT tools: (autoCAD, ArchCAD) • Existing structures • Print media • Drawing equipment

7.7 TOPIC 7: SITE WORKS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.7 Setting Out	• describe environmental laws affecting wetland construction and protected plant species • explain By-laws governing setting out of buildings • describe the process of setting out a building • set out a building using the builder's square and 3,4,5 method • erect corner and side profiles • mark out foundation trenches	• Environmental laws affecting site clearance, wetland construction and protected plant species • By-laws governing setting out of buildings • 3,4,5 method and builders square • Corner and side profiles • Ranging lines • Foundation trenches	• Assembling and erecting corner and side profiles • Observing By-laws from Environmental Management Agency (EMA) • Observing by-laws on setting out a building • Checking out diagonals • Marking out foundation trenches	• Setting out tools • Resource person • ICT tools • Print media

7.8 TOPIC 8: SUB STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.8.1 Pile and Bore	• explain the meaning of piling in foundation work • describe types of piles used in foundation work • illustrate methods of placing piles • differentiate between bearing piles and friction piles	• Piling in foundations • Types of pile: - Placement - Displacement • Methods of placing piles: - boring for replacement - displacement using hammer - percussion method • Bearing piles and friction piles	• Drawing types of piles • Making models of different types of piles • Experimenting on effects of piling on clay soils	• ICT tools • Timber • Resource persons • Tools • Print media

7.9 TOPIC 9: FLOORS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.9.1 Floors	• differentiate a solid ground floor from a suspended ground floor • describe the constructional procedure for solid ground floors and suspended ground floors • state the merits and demerits of each floor finish • demonstrate the process of fixing different floor finishes.	• Types of floors - Solid ground floors - Suspended ground floors • Constructional requirements of floors • Floor finishes: - Granolithic - Terrazzo - Tiles - Carpets - Stone - Brick - Timber	• Drawing and labeling diagrams of solid and suspended floors • Practicing fixing of selected floor finishes • Visiting existing buildings	• Recommended textbooks • Existing buildings • ICT tools • Print media • Floor materials

7.9 TOPIC 9: FLOORS CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
		• Fixing procedure for floor finishes		

7.10 TOPIC 10: SUPER STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.10.1 Forces on Walls	• illustrate the different types of forces • calculate stress on a wall • describe methods of strengthening and stabilising walls	• Types of forces acting on walls: - Tension - Compression - Shear • Methods of strengthening and stabilising walls: - Reinforcement - Buttressing - Attached piers	• Making models showing the forces • Calculating stress • Constructing buttressed walls and attached piers	• Models • ICT tools • Resource person • Print media
7.10.2 Fixing of Frames to Openings	• describe the process of fixing door and window frames • fix window and door frames	• procedure in fixing of metal and wooden frames to openings	• Describing sequence of fixing window and door frames • Fixing frames to a wall	• Door and window frames • ICT tools • Resource persons • Print media
7.10.3 Arches	• define arches • State reasons for using arches • construct arches	• Purposes of arches • Types: - Segmental - Semi- circular • Arch terms • Geometrical construction of arches	• Geometrical construction of arches • Constructing arches using building units	• ICT tools • Resource persons • Drawing equipment • Construction materials • Templates • Existing structures
7.10.4 Plastering	• identify plastering tools • demonstrate plastering skills	• Backgrounds to receive plaster • Plastering tools • Procedures: - Preparations • Application	• Preparing the background to be plastered • Selecting appropriate plastering tools • Demonstrating required	• Plastering tools • Plastering materials

7.10 TOPIC 10: SUPER STRUCTURE CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
			required plastering skills	• Print media
7.10.5 Painting	• identify types of paints • prepare a background to receive painting • select the appropriate tools for a painting task • use painting tools correctly	• Types of paints - water based - oil paints • Backgrounds to receive paint • Painting tools • Procedures: - surface preparation - application	• Identifying the types of paints appropriate for different backgrounds • Selecting appropriate painting tools • Preparing a background to receive painting • painting a surface	• Painting tools • Paint catalogues • ICT tools • Surfaces to be painted
7.10.7 Design and Construction of Roofs	• illustrate roof forms • define roof terms • state methods of fixing roof covering materials • design and construct roof trusses	• Roof forms, component parts and functions • Construction and erection of timber roof trusses • Timber pitched roofs up to 7,5m span • Roof covering materials • Details of eaves and verges	• Designing roof trusses • Constructing models of roof trusses • Visiting existing buildings	• ICT tools • Models of roof trusses • Existing buildings • Print media

7.11 TOPIC 11: QUANTITIES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.11 Sub structure Bill of Quantities	• calculate the quantities of materials for a sub structure bill of quantities	• Site clearing • Reduced level dig • Setting out	• Calculating the area to be cleared	• Working drawings • ICT tools • Print media

7.11 TOPIC 11: QUANTITIES CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
	• calculate the cost of labour required to execute the activities involved in the sub structure	• Sub structure - Trench excavations - Trench levelling - Footing concrete - Footing brickwork - Backfilling and compaction - Termite prevention - Electrical tubing - Oversite concrete	• Calculating the volume of reduced dig, trench excavations and volumes of materials • Calculating the labour costs of carrying out the substructure activities	

7.12 TOPIC 12: SERVICES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.12.1 .Movement of Electricity from the Source	• Calculate power reduction from the source to the consumer	• High and low voltage • Industrial usage of electricity • Domestic usage of electricity	• Applying different phases • Conducting educational tours	• First aid kit • Resource person • Recommended textbooks • Print media • ICT tools
7.12.2 House Installation	• Analyse use of by-laws • Describe the function of a distribution board	• Usage of by-laws • Distribution board - Lights - Plugs - Geysers - Cooker -	• Applying by-laws when installing electricity Designing an electric circuit model	• Resource person • Recommended textbooks • Print media • ICT tools • Cardboard boxes • Electric cables

7.12 TOPIC 12: SERVICES CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.12.3 Cold and Hot water Supply	• Differentiate between direct and indirect hot water supply systems • identify pipes used for hot water supply • demonstrate distribution of hot water supply	• Direct and indirect hot water supply • materials used for water pipes • Distribution of hot water from the geyser to the point of use • Sources of energy for hot water	• Discussing systems of hot water supply • Selecting materials used for hot water pipes • Demonstrating the distribution of hot water from the source to the point of use	• Recommended textbooks • Water supply materials • Resource persons • Plumbing tools

FORM 4

7.0 COMPETENCY MATRIX

7.1 TOPIC 1:BUILDING TECHNOLOGY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.1.1 Tender and Contract Procedures	• invite tenders • respond to tenders • draft contract documents	• Tendering • Types of tenders • Types of contracts	• Preparing tender documents • Responding to tender documents • Composing contract documents	• Statutory instruments • Tender and contract documents • Print media
7.1.2 Entrepreneurship Skills in Building Technology and Design	• Exercise ethical business practices (unhu/ubuntu) • Demonstrate knowledge of company formation procedures • Explain ways of sourcing finances	• Entrepreneurship skills: - company formation and business registration - business ethics • Business growth	• Practicing the business ethics • Explaining legal requirements in company formation and registration • Sourcing for financial help	• Print media • Financial institutions • Resource person

7.2 TOPIC 2:HEALTH AND SAFETY

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.2.1 Personnel involved in Health and Safety in the Work Place	• demonstrate the evacuation and handling of injured persons at a building site • express knowledge of the duties of health and building inspectors	• Duties of health and building inspectors	• Role playing of the evacuation and handling of injured persons • Discussing the duties of health and building inspectors	• NSSA Inspectors • Local Government Inspectors • Local Authority

7.2 TOPIC 2:HEALTH AND SAFETY CONTD..

KEY CONCEPTS	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.2.2 Handling of Hazardous Substances	• use and handle hazardous substances in line with regulations • recognize signs and symptoms of a poisoned person	• Regulations of handling hazardous substances: - Colour codes - Safety clothing - Disposal of empty containers - Signs and symptoms of a poisoned person	• Demonstrating the correct use and handling of the hazardous substances • Making charts with colour codes • Attending to a poisoned person	• Empty poison containers • Protective clothing • Print media • Resource persons
7.2.3 Application of First Aid	• apply First Aid procedures • evacuate a poisoned person • call for help	• First Aid equipment and procedures	• Applying First Aid to poisoned persons	• First Aid Kit • Resource persons • Stretcher bed

7.3 TOPIC 3: BUILDING TOOLS AND EQUIPMENT

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.3.1 Servicing and Maintenance of Scaffolds and ladders	• identify faults on scaffolds ladders and accessories • carry out maintenance of scaffolds and ladders	• Scaffolds and ladders - Certificate of fitness	• Servicing and maintaining scaffolds and ladders	• Scaffolds • Ladders • Resource persons

7.4 TOPIC 4: MATERIALS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.4.1 Science of Building Materials	• carry out experiments • examine properties of building materials	• Properties of indigenous building materials:	• Carrying out experiments • Identifying different properties of materials • Conducting educational tours	• Different building materials • Laboratory • Zimbabwe ruins • Khami ruins

7.4 TOPIC 4: MATERIALS CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.4.2 Conservation of the Environment	• observe the importance of natural resources to the community • analyse different methods of preserving the environment	• Importance of the natural environment resources • Effects of sourcing out materials to the environment • Methods of conservation	• Visiting virgin land • Identifying environmental affected areas in and around the school and community • Reclaiming eroded/degraded sites	• Rubble • Gravel • Broken bricks • Retaining walls

7.5 TOPIC 5: BONDING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.5.1 Bond Solving	• demonstrate the ability to solve bonding up to 2 brick thick walls • construct walls up to 2 brick thick • draw plans and elevations up to 2 brick thick walls • construct boundary walls and decorative walls in stonework	• Bond solving of: - Straight walls - junction walls - return angle walls in stretcher, english and english garden wall bonds • Rules and regulations of bonding • Plans and elevations of walls • Stonework - Ashlar - random rubble	• Bond solving • Constructing walls using bricks, blocks, stone work • Drawing plans and elevations up to 2 brick thick walls	• Print media • Existing walls • ICT tools • Drawing equipment • Bricks, blocks and stones

7.6 TOPIC 6: DESIGN AND DRAWING

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.6.1 Design project	• apply knowledge of the design process to solve a given situation • construct models	• Stages of design process: - situation - design brief - investigations - possible solutions - working drawings - evaluation	• Researching on given situations • Designing building plans • Observing by-laws • Making models • Evaluating the designs	• ICT tools: autoCAD, ArchiCAD • Recommended textbooks • Pictures of structures • Existing structures

7.7 TOPIC 7: SITE WORKS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.7.1Setting Out Equipment	• mount levelling instruments • record readings from a levelling staff • calculate rise and falls • do a mathematical checking	• Setting out instruments: - dumpy level - theodolites • Use and care of setting out instruments	• Measuring distances • Constructing angles on the ground • Transferring levels using line levels, straight edges and bonning rods • Levelling pegs using instruments • Recording readings using standard format	• Setting out instrument • Resource persons • ICT tools

7.8 TOPIC 8: SUB STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.8.1 Wall positioning on Foundations	• plumb down from ranging lines • raise corners • determine forces that act on foundations	• Plumbing down • Procedures when raising corners • Forces acting on foundations	• Plumbing down from ranging lines • Raising corners using gauge rods, at spint level • Explaining forces that act on foundations	• ICT tools • Building tools • Print Media

7.9 TOPIC 9: FLOORS

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.91 Landscaping	• state reasons for landscaping • identify materials for landscaping • describe constructional requirements for roads and driveways • landscape a given area using available materials	• Types of landscape developments: - Rockery - Pavings - Flower beds - Fish ponds • Materials for landscaping: - Bricks - Stones - Bitumen	• Discussing aesthetic value of landscaping • Carrying out practical activities on landscaping • Visiting public places	• ICT tools • Recommended textbooks • Landscaped areas • Existing buildings

7.10 TOPIC 10: SUPER STRUCTURE

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.10.1 Prefabricated Structures	• state merits and demerits of prefabricated structures • list different materials used for prefabricated structures • state the functional requirements of	• Prefabricated structures - Materials used - Functional requirements - Designs - methods of assembling	• Visiting sites with prefabricated structures • Designing and assembling prefabricated structures • Model making • Research on prefabricated	• Models • Resource persons • ICT tools • Print media

7.10 TOPIC 10: SUPER STRUCTURE CONTD..

KEY CONCEPTS	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
	prefabricated structures • design and assemble prefabricated structures		structures using traditional materials	
7.10.2 Garden Walls and Retaining Walls	• explain functions of garden and retaining walls • design garden and retaining walls	• Types of garden and retaining walls: - functions - designs • Forces acting on retaining walls	• Visiting areas with garden and retaining walls • Designing garden and retaining walls • Making models	• Recommended textbooks • Drawing equipment • ICT tools • Existing walls
7.10.3 Thresholds and Stairs	list materials for thresholds and staircases • state regulations governing the construction of thresholds and staircases • design a staircase	• Materials for stairs • Constituent parts and layout of thresholds and stairs with landing • Constructional details of thresholds and staircases	• Identifying materials • Explaining term associated with thresholds and stairs • Visiting existing buildings • Designing thresholds and staircases •	• Thresholds and stairs cases • ICT tools • Print media
7.10.4 Tiling	• identify types of floor and wall tiles demonstrate use of tiling tools	• Floor tiles • Fixing procedures • Types of tiles - Ceramic - Vynil - Porcelain - Stone • Wall tiles Ceramic	• Conducting educational tours • Identifying different types of tiles suitable for walls and floors Practicing laying of wall and floor tiles	• Existing buildings • Recommended textbooks • Samples of tiles • Tiling tools • Adhesives Models
7.10.5 Cladding	• describe cladding explain the methods of fixing cladding	• Materials used for cladding • Fixing of cladding	• Conducting educational tours • Cladding surfaces	• Existing buildings • Recommended textbooks • Cladding tools

7.10 TOPIC 10: SUPER STRUCTURE CONTD..

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
		- Prefabricated cladding units - Fastening materials	• Conducting educational tours • Cladding surfaces	• Existing buildings • Cladding tools • Fastening materials • Models
7.10.6 Wall Papering	• select appropriate wall papers to suit different building interiors	• Wall papers - Functions and functional requirements: • Wall paper printing techniques - Surface printing - Digital printing - Screen printing	• Discussing functions and functional requirements • Conducting educational tours • Applying wall paper	• Wall papers • Adhesives • Photographs • Existing buildings

7.11 TOPIC 11: QUANTITIES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.11.1 Bill of Quantities of Super Structure	• calculate the quantities of materials used in the super structure • estimate the cost of labour required to execute the activities involved in the superstructure	• Walls and wall finishes • Window and door openings • Roofing timber • Roof covering materials: • Brick force	• Calculating the quantities of different materials required • Estimating the costs of labour needed to construct the super structure	• Working drawings • Existing structures • Building materials • Resource persons • Print media

7.12 TOPIC 12: SERVICES

KEY CONCEPT	OBJECTIVES Learners should be able to:	CONTENT (ATTITUDES, SKILLS AND KNOWLEDGE)	SUGGESTED NOTES AND ACTIVITIES	SUGGESTED RESOURCES
7.12.1 Renewable Energy	• identify equipment used in renewable energy systems • describe how biogas digester and solar panels work • Design and construct biogas digester for school/community •	• Solar energy equipment: - solar panels - invertors - batteries - cables - light bulbs • Biogas • Biogas digester	• Discussing the uses of the different energy equipment • Sketching solar energy production system • Sketching biogas digester system • Designing and constructing biogas digester for school/community • Conducting educational tours •	• Resource persons • Solar and bio gas energy production equipment • Models • Refuse • Print media
7.12.2 Water Borne Drainage Systems	• differentiate the public sewer from the septic tank system • describe the treatment of effluent	• Conveyance of effluent from the building to the septic tank and main sewer line • Treatment of effluent: - septic tank - sewage ponds	• Explaining the operational systems of septic tank and public sewer • Discussing the treatment of effluent • Making models of septic tank and sewage ponds • Conducting educational tours to sewage treatment plants	• Resource persons • Existing infrastructure • Models • ICT tools • Print media

8.0 ASSESSMENT

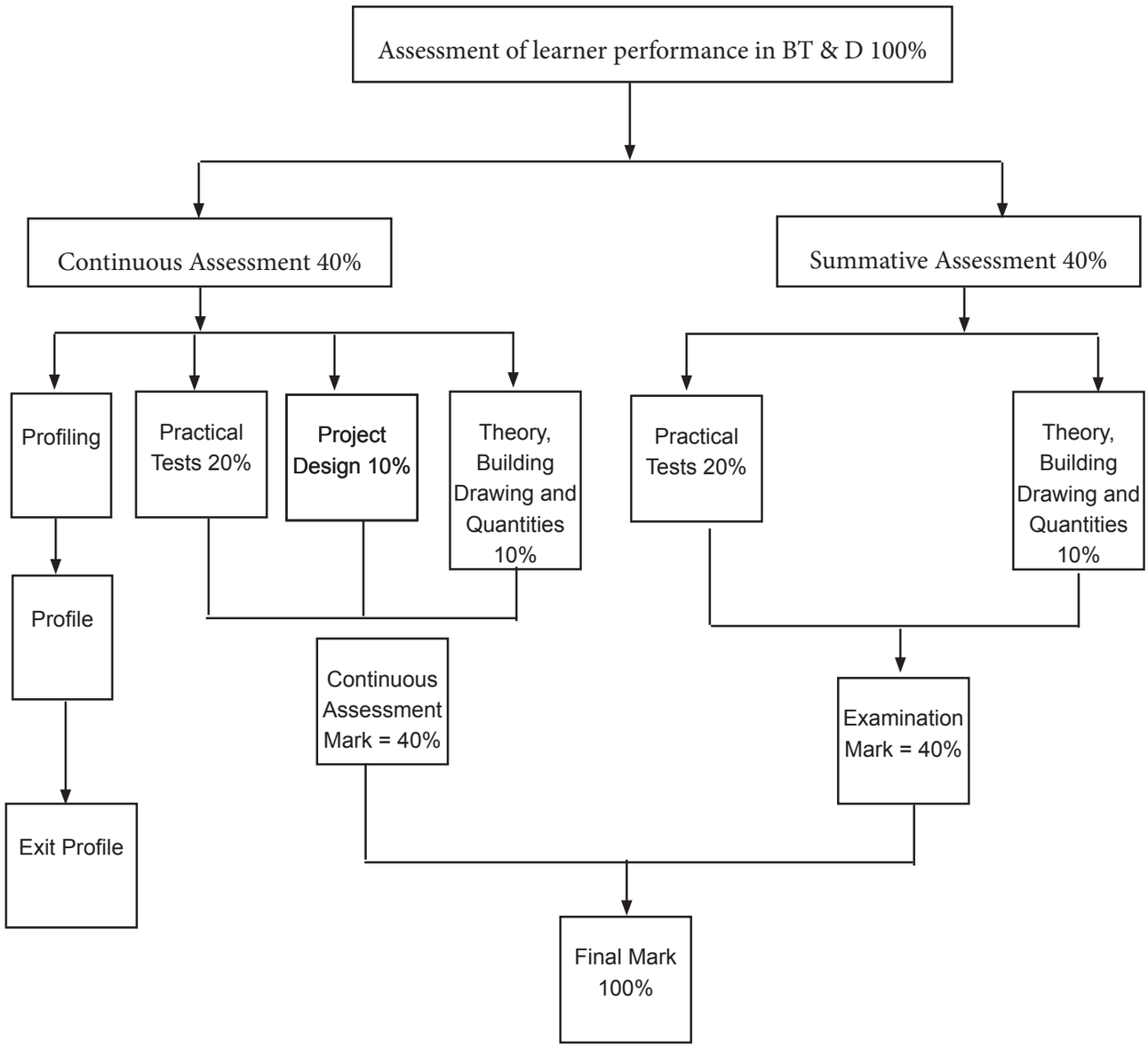
Forms 1 - 4 Building Technology and Design candidates will be assessed through continuous and summative methods. The syllabus' scheme of assessment is grounded in the principle of inclusivity. Arrangements, accommodation and modification must be visible in both continuous and summative assessments to enable candidates with special needs to access assessments and receive accurate performance measurement of their abilities.

(a) ASSESSMENT OBJECTIVES

By the end of the course learners will be expected to:

8.1 state functions of different operatives, tradesperson and professionals in the building industry
8.2 describe health and safety measures in the building industry
8.3 identify tools, equipment and materials used in Building Technology and Design
8.4 demonstrate the correct use of any building tool and material
8.5 conduct experiments to determine the strengths, durability and quality of building materials
8.6 describe the safety and environmental conservation practices on any building site
8.7 solve bonding problems in Stretcher, English and English garden wall bonds up to 230mm wall thickness
8.8 design and construct a structure from a given brief
8.9 demonstrate ICT skills in building drawing and design
8.10 calculate quantities of building materials and labour costs for any given construction work
8.11 define terms used in Building Technology and Design
8.12 outline the importance of Building Design and Technology
8.13 interpret and evaluate building designs
8.14 apply acquired skills to solve real life situations in building
8.15 demonstrate the use of indigenous technologies and materials in the design and construction of structures
8.16 demonstrate knowledge of building regulations (by- laws) in design and construction

ASSESSMENT MODEL



10.2 CONTINUOUS AND SUMMATIVE ASSESSMENT

Continuous and summative assessment will be done in the theory, practical and design components of the syllabus. At the beginning of the implementation of the new syllabus, weighting of the components are as follows:

Summative Assessment – 60%

Continuous Assessment – 40%

ASSESMENT MODE	THEORY, BUILDING DRAWING AND QUANTITIES	PRACTICAL	DESIGN
Summative	25%	35%	NIL
Continuous	10%	20%	10%

(c) SPECIFICATION GRID

OBJECTIVES/COMPONENTS	PAPER 1	PAPER 2	CONTINUOUS
Knowledge with understanding	40%	20%	30%
Practical skills and their application	40%	60%	40%
Decision making and judgment	20%	20%	30%
TOTALS	**100%**	**100%**	**100%**

10.4 SUMMATIVE ASSESSMENT

Paper 1: Theory, drawing and quantities

The paper consists of 3 Sections i.e. Section A, Section B and Section C

SECTION A 10 compulsory structured questions on building construction, design, drawing and quantities will be answered

SECTION B 2 questions will be answered out of 4 questions on building construction

SECTION C 1 question out of 2 will be answered on drawing and quantities

TIME: 2 hours 30 minutes

WEIGHTING: 25%

Paper 2: Practical

A practical test piece based on brickwork and plastering will be set. Candidates will be required to work from dimensioned sketches, written descriptions or scaled drawing.

TIME: 3 hours 30 minutes

WEIGHTING: 35%

CONTINUOUS ASSESSMENT

Continuous assessment will comprise theory, practical tests and design exercises as illustrated below:

TERMS	1	2	3	4	5	6	7	8	9	10	11	12	%	Weighting
Theory Drawing and Quantities	1		1	1		1	1		1	1	1		20	40%
Practical Projects	1		1		1	1	1	1	1	1	1		50	
Design Projects	1			1			1			1			30	
Total													100	