REPUBLIC OF KENYA

COMPETENCY BASED CURRICULUM

FOR

ARCHITECTURAL TECHNOLOGY

LEVEL 6

TVET CDACC
P.O BOX 15745-00100
NAIROBI

First published 2019

Council Secretary/CEO
TVET Curriculum Development, Assessment and Certification Council
P.O. Box 15745–00100
Nairobi, Kenya
Email: info@tvetcdacc.go.ke

FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement Kenya's development blue print and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, Curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in Curriculum development to ensure the Curriculum addresses its competence needs. It is against this background that this Curriculum has been developed.

It is my conviction that this Curriculum will play a great role towards development of competent human resource for the Construction sector's growth and sustainable development.

PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION

PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, "middle-income country providing a high-quality life to all its citizens by the year 2030". Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 on Reforming Education and Training in Kenya, emphasized the need to reform Curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Construction Sector Skills Advisory Committee (SSAC) have developed this Curriculum.

This curriculum has been developed following the CBET framework policy; the CBETA standards and guidelines provided by the TVET Authority and the Kenya National Qualification Framework designed by the Kenya National Qualification Authority.

The Curriculum is designed and organized with an outline of learning outcomes; Suggested Methods of Instruction, training/learning resources and methods of assessing the trainee's achievement. The Curriculum is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, Construction SSAC, expert workers and all those who participated in the development of this Curriculum.

CHAIRPERSON, TVET CDACC

ACKNOWLEDGEMENT

This Curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the Curriculum, significant involvement and support was received from various organizations.

I recognize with appreciation the role of the SSAC in ensuring that competencies required by the industry are addressed in this Curriculum. I also thank all stakeholders in the Construction sector for their valuable input and all those who participated in the process of developing this Curriculum.

I am convinced that this Curriculum will go a long way in ensuring that workers in Construction sector will acquire competencies that will enable them to perform their work more efficiently.

COUNCIL SECRETARY/CEO

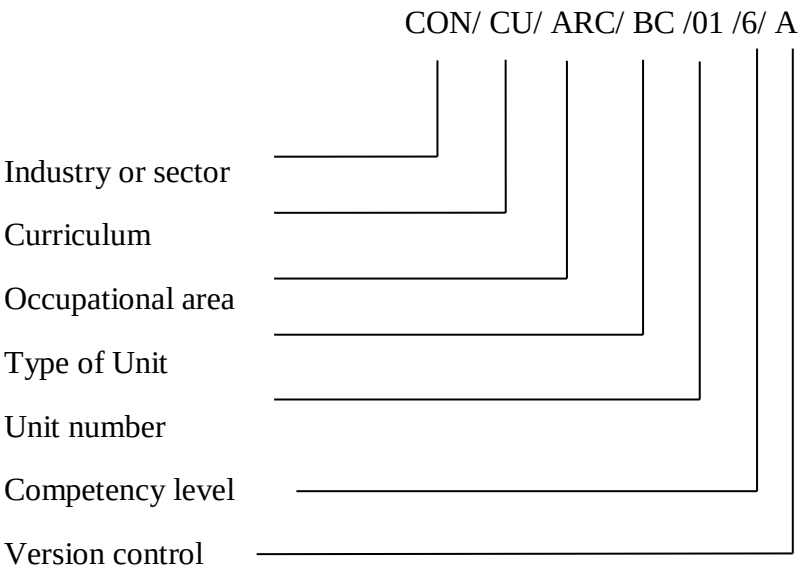
TVET CDACC

Table of Contents

ABBREVIATIONS AND ACRONYMS

ARC	: Architecture
BC	: Basic Competency
BIM	: Building information management systems
CC	: Common Competency
CDACC	: Curriculum Development, Assessment and Certification Council
CON	: Construction
CPU	: Central Processing Unit
CR	: Core Competency
CU	: Curriculum
EPS	: Expanded Polystyrene Systems
HVAC	: Heating Ventilation Air Conditioning
ICT	: Information Communication Technology
KCPE	: Kenya Certificate of Primary Education
KCSE	: Kenya Certificate of secondary Education
KNQA	: Kenya National Qualifications Authority
NCA	: National Construction Authority
NEMA	: National Environmental Management Authority
OSHA	: Occupation Safety and Health Act
OSHS	: Occupation Safety and Health Standards
PC	: Personal Computer
PPE	: Personal Protective Equipment
SOPs	: Standard Operating Procedures
SSAC	: Sector Skills Advisory Committee
TVET	: Technical and Vocational Education and Training

KEY TO UNIT CODE



COURSE OVERVIEW

This course consists of competencies required by an Architectural Technician to carry out architectural studio design, architectural perspectives, architectural modelling, architectural cost and estimates, architectural landscaping, building finishes and fittings, alternative building technology and construction site management

It consists of the following units of learning:

BASIC UNITS OF LEARNING

UNIT CODE	UNIT OF LEARNING	DURATION IN HRS	CREDIT FACTORS
CON/CU/ARC/BC/01/6/A	Communication skills	40	4
CON/CU/ARC/BC/02/6/A	Numeracy	60	6
CON/CU/ARC/BC/03/6/A	Digital literacy	60	6
CON/CU/ARC/BC/04/6/A	Entrepreneurship	100	10
CON/CU/ARC/BC/05/6/A	Employability skills	80	8
CON/CU/ARC/BC/06/6/A	Environmental literacy	40	4
CON/CU/ARC/BC/07/6/A	Occupational safety and health practices	40	4
	TOTAL	**420**	**42**

COMMON UNITS OF LEARNING

UNIT CODE	UNIT OF LEARNING	DURATION IN HRS	CREDIT FACTORS
CON/CU/ARC/CC/01/6/A	Applied mathematics	80	8
CON/CU/ARC/CC/02/6/A	Technical drawing	60	6
CON/CU/ARC/CC/03/6/A	Building materials science	100	10
CON/CU/ARC/CC/04/6/A	Workshop technology practices	60	6
CON/CU/ARC/CC/05/6/A	Building technology and Services	100	10
CON/CU/ARC/CC/06/6/A	History of Architecture	200	20

CON/CU/ARC/CC/07/6/A	Structural design	200	20
	TOTAL	**800**	**80**

CORE UNITS OF LEARNING

UNIT CODE	UNIT OF LEARNING	DURATION IN HRS	CREDIT FACTORS
CON/CU/ARC/CR/01/6/A	Architectural Project design	240	24
CON/CU/ARC/CR/02/6/A	Architectural perspectives	60	6
CON/CU/ARC/CR/03/6/A	Architectural modelling	100	10
CON/CU/ARC/CR/04/6/A	Architectural cost and estimates	100	10
CON/CU/ARC/CR/05/6/A	Architectural landscaping	60	6
CON/CU/ARC/CR/06/6/A	Building finishes and fittings	100	10
CON/CU/ARC/CR/07/6/A	Alternative building technology	60	6
CON/CU/ARC/CR/08/6/A	Construction site management	60	6
	Industrial attachment	480	48
	TOTAL	1260	126
	GRAND TOTAL	2480	248

The total duration of the course is **2480** hours which include 480 hours of industrial attachment.

Entry Requirements
An individual entering this course should have any of the following minimum requirements:

a) Kenya Certificate of Secondary Education (KCSE) mean grade C- (minus)

Or

b) Equivalent qualifications as determined by Kenya National Qualifications Authority (KNQA)

Trainer qualification

A trainer for this course should have a higher qualification than the level of this course

Industrial attachment

An individual enrolled in this course will be required to undergo an attachment for a period of three months. An individual enrolled in one of the core units of learning will be required to undergo a one month's attachment.

Assessment

The course will be assessed at two levels: internally and externally. Internal assessment is continuous and is conducted by the trainer who is monitored by an accredited internal verifier while external assessment is the responsibility of TVET CDACC.

Certification

A candidate will be issued with a Certificate of Competency for each core unit of competency. To attain the qualification in Architectural Technology Level 6, the candidate must demonstrate competence in all the units of competency as given in qualification pack. These certificates will be issued by TVET CDACC in conjunction with training provider.

BASIC UNITS OF LEARNING

COMMUNICATION SKILLS

UNIT CODE: CON/CU/ARC/BC/01/6/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Communication Skills

Duration of Unit: 40 hours

Unit Description

This unit covers the competencies required to demonstrate communication skills .It involves, meeting communication needs of clients and colleagues; developing communication strategies, establishing and maintaining communication pathways, conducting interviews, facilitating group discussion and representing the organization.

Summary of Learning Outcomes

1. Meet communication needs of clients and colleagues
2. Develop communication strategies
3. Establish and maintain communication pathways
4. Promote use of communication strategies
5. Conduct interview
6. Facilitate group discussion
7. Represent the organization

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Meet communication needs of clients and colleagues	• Communication process • Modes of communication • Medium of communication • Effective communication • Barriers to communication • Flow of communication • Sources of information • Organizational policies	• Interview • Written texts

	• Organization requirements for written and electronic communication methods • Report writing • Effective questioning techniques (clarifying and probing) • Workplace etiquette • Ethical work practices in handling communication • Active listening • Feedback • Interpretation • Flexibility in communication • Types of communication strategies • Elements of communication strategy	
2. Develop communication strategies	• Dynamics of groups • Styles of group leadership • Openness and flexibility in communication • Communication skills relevant to client groups	• Interview • Written texts
3. Establish and maintain communication pathways	• Types of communication pathways	• Interview • Written texts
4. Promote use of communication strategies	• Application of elements of communication strategies • Effective communication techniques	• Interview • Written texts
5. Conduct interview	• Types of interview • Establishing rapport • Facilitating resolution of issues • Developing action plans	• Interview • Written texts

6. Facilitate group discussion	• Identification of communication needs • Dynamics of groups • Styles of group leadership • Presentation of information • Encouraging group members participation • Evaluating group communication strategies	• Interview • Written texts
7. Represent the organization	• Presentation techniques • Development of a presentation • Multi-media utilization in presentation • Communication skills relevant to client groups	• Interview • Written texts

Suggested Methods of Instruction

- Discussion
- Role playing
- Simulation
- Direct instruction

Recommended Resources

- Desktop computers/laptops
- Internet connection
- Projectors
- Telephone

NUMERACY SKILLS

UNIT CODE: CON/CU/ARC/BC/02/6/A

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Demonstrate Numeracy Skills.

Duration of Unit: 60 hours

Unit Description
This unit describes the competencies required to demonstrate numeracy skills. It involves applying a wide range of mathematical calculations for work; applying ratios, rates and proportions to solve problems; estimating, measuring and calculating measurement for work; using detailed maps to plan travel routes for work; using geometry to draw and construct 2D and 3D shapes for work; collecting, organizing and interpreting statistical data; using routine formula and algebraic expressions for work and using common functions of a scientific calculator.

Summary of Learning Outcomes

1. Apply a wide range of mathematical calculations for work
2. Apply ratios, rates and proportions to solve problems
3. Estimate, measure and calculate measurement for work
4. Use detailed maps to plan travel routes for work
5. Use geometry to draw and construct 2D and 3D shapes for work
6. Collect, organize and interpret statistical data
7. Use routine formula and algebraic expressions for work
8. Use common functions of a scientific calculator

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply a wide range of mathematical calculations for work	• Fundamentals of mathematics • Addition, subtraction, multiplication and division of positive and negative numbers	• Written tests • Assignments • Supervised exercises

	• Algebraic expressions manipulation • Forms of fractions, decimals and percentages • Expression of numbers as powers and roots	
2. Apply ratios, rates and proportions to solve problems	• Rates, ratios and proportions • Meaning • Conversions into percentages • Direct and inverse proportions determination • Performing calculations • Construction of graphs, charts and tables • Recording of information	• Written tests • Assignments • Supervised exercises
3. Estimate, measure and calculate measurement for work	• Units of measurements and their symbols • Identification and selection of measuring equipment • Conversion of units of measurement • Perimeters of regular figures • Areas of regular figures • Volumes of regular figures • Carrying out measurements • Recording of information	• Assignments • Supervised exercises • Written tests
4. Use detailed maps to plan travel routes for work	• Identification of features in routine maps and plans • Symbols and keys used in routine maps and plans • Identification and interpretation of orientation of map to North • Demonstrate understanding of direction and location	• Written • Practical test

	• Apply simple scale to estimate length of objects, or distance to location or object • Give and receive directions using both formal and informal language • Planning of routes • Calculation of distance, speed and time	
5. Use geometry to draw and construct 2D and 3D shapes for work	• Identify two dimensional shapes and routine three dimensional shapes in everyday objects and in different orientations • Explain the use and application of shapes • Use formal and informal mathematical language and symbols to describe and compare the features of two dimensional shapes and routine three dimensional shapes • Identify common angles • Estimate common angles in everyday objects • Evaluation of unknown angles • Use formal and informal mathematical language to describe and compare common angles • Symmetry and similarity • Use common geometric instruments to draw two dimensional shapes	

	• Construct routine three dimensional objects from given nets	

6. Collect, organize and interpret statistical data	• Classification of data
	  • Grouped data
	  • Ungrouped data
	• Data collection
	  • Observation
	  • Recording
	• Distinguishing between sampling and census
	• Importance of sampling
	• Errors in sampling
	• Types of sampling and their limitations e.g.
	  • Stratified random
	  • Cluster
	  • Judgmental
	• Tabulation of data
	  • Class intervals
	  • Class boundaries
	  • Frequency tables
	  • Cumulative frequency
	• Diagrammatic and graphical presentation of data e.g.
	  • Histograms
	  • Frequency polygons
	  • Bar charts
	  • Pie charts
	  • Cumulative frequency curves
	• Interpretation of data
		• Assignments
		• Supervised exercises
		• Written tests

7. Use routine formula and algebraic expressions for work	• Solving linear equations
	• Linear graphs
	  • Plotting
	  • Interpretation
	• Applications of linear graphs
		• Assignments
		• Supervised exercises
		• Written tests

	• Curves of first and second degree
	  • Plotting
	  • Interpretation	

8. Use common functions of a scientific calculator	• Identify and use keys for common functions on a calculator • Calculate using whole numbers, money and routine decimals and percentages • Calculate with routine fractions and percentages • Apply order of operations to solve multi-step calculations • Interpret display and record result	• • Written • Practical test

Suggested Methods of Instruction

- Group discussions
- Demonstration by trainer
- Practical work by trainee
- Exercises

Recommended Resources

- Calculators
- Rulers, pencils, erasers
- Charts with presentations of data
- Graph books
- Dice

DIGITAL LITERACY

UNIT CODE: CON/CU/ARC/BC/03/6/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Digital Literacy

Duration of Unit: 60 hours

Unit Description

This unit describes competencies required to demonstrate digital literacy. It involves in identifying computer software and hardware, applying security measures to data, hardware, software in automated environment, computer software in solving task, internet and email in communication at workplace, desktop publishing in official assignments and preparing presentation packages.

Summary of Learning Outcomes

1. Identify computer software and hardware
2. Apply security measures to data, hardware, software in automated environment
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace
5. Apply desktop publishing in official assignments
6. Prepare presentation packages

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify computer hardware and software	• Concepts of ICT • Functions of ICT • History of computers • Components of a computer • Classification of computers	• Written tests • Oral presentation
2. Apply security measures to data, hardware, software in automated environment	• Data security and control • Security threats and control measures • Types of computer crimes • Detection and protection against computer crimes	• Written tests • Oral presentation • Project

	• Laws governing protection of ICT	
3. Apply computer software in solving tasks	• Operating system • Word processing • Spread sheets • Data base design and manipulation • Data manipulation, storage and retrieval	• Oral questioning • Project
4. Apply internet and email in communication at workplace	• Computer networks • Network configurations • Uses of internet • Electronic mail (e-mail) concept	• Oral questioning • Written report
5. Apply desktop publishing in official assignments	• Concept of desktop publishing • Opening publication window • Identifying different tools and tool bars • Determining page layout • Opening, saving and closing files • Drawing various shapes using DTP • Using colour pellets to enhance a document • Inserting text frames • Importing and exporting text • Object linking and embedding • Designing of various publications • Printing of various publications	• Oral questioning • Written report • Project

6. Prepare presentation packages	• Types of presentation packages • Procedure of creating slides • Formatting slides • Presentation of slides • Procedure for editing objects	• Oral questioning • Written report • Project

Suggested Methods of Instruction

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Project
- Group discussions

Recommended Resources

- Computers
- Printers
- Storage devices
- Internet access

ENTREPRENEURIAL SKILLS

UNIT CODE: CON/CU/ARC/BC/04/6/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Entrepreneurial Skills

Duration of unit: 100 hours

Unit Description

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship and self-employment. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

Summary of Learning Outcomes

1. Demonstrate understanding of who an entrepreneur
2. Demonstrate knowledge of entrepreneurship and self-employment
3. Identify entrepreneurship opportunities
4. Create entrepreneurial awareness
5. Apply entrepreneurial motivation
6. Develop business innovative strategies
7. Develop Business plan

Learning Outcome	Content	Suggested Assessment Methods

1. Demonstrate knowledge of entrepreneurship and self-employment	• Importance of self-employment • Requirements for entry into self-employment • Role of an Entrepreneur in business • Contributions of Entrepreneurs to National development • Entrepreneurship culture in Kenya • Born or made entrepreneurs	• Individual/group assignments • Projects • Written tests • Oral questions • Third party report
2. Identify entrepreneurship opportunities	• Business ideas and opportunities • Sources of business ideas • Business life cycle • Legal aspects of business • Assessment of product demand • Business environment • Factors to consider when evaluating business environment • Technology in business	• Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
3. Create entrepreneurial awareness	• Forms of businesses • Sources of business finance • Factors in selecting source of business finance • Governing policies on Small Scale Enterprises (SSEs) • Problems of starting and operating SSEs	• Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews

4. Apply entrepreneurial motivation	• Internal and external motivation • Motivational theories • Self-assessment • Entrepreneurial orientation • Effective communications in entrepreneurship • Principles of communication • Entrepreneurial motivation	• Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
5. Develop business innovative strategies	• Innovation in business • Small business Strategic Plan • Creativity in business development • Linkages with other entrepreneurs • ICT in business growth and development	• Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
6. Develop Business Plan	• Business description • Marketing plan • Organizational/Management • plan • Production/operation plan • Financial plan • Executive summary • Presentation of Business Plan	• Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews

Suggested Methods of Instruction

- Direct instruction
- Project
- Case studies
- Field trips
- Discussions
- Demonstration

- Question and answer
- Problem solving
- Experiential
- Team training

Recommended Resources

- Case studies
- Business plan templates
- Computers
- Overhead projectors
- Internet
- Mobile phone
- Video clips
- Films
- Newspapers and Handouts
- Business Journals
- Writing materials

EMPLOYABILITY SKILLS

UNIT CODE: CON/CU/ARC/BC/05/6/A

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Demonstrate Employability Skills

Duration of Unit: 80 hours

Unit Description
This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing ethical performance.

Summary of Learning Outcomes

1. Conduct self-management
2. Demonstrate interpersonal communication
3. Demonstrate critical safe work habits
4. Lead a workplace team
5. Plan and organize work
6. Maintain professional growth and development
7. Demonstrate workplace learning
8. Demonstrate problem solving skills
9. Manage ethical performance

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Conduct self-management	• Self-awareness • Formulating personal vision, mission and goals • Strategies for overcoming life challenges • Managing emotions • Emotional intelligence	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

	• Assertiveness versus aggressiveness • Expressing personal thoughts, feelings and beliefs • Developing and maintaining high self-esteem • Developing and maintaining positive self-image • Setting performance targets • Monitoring and evaluating performance • Articulating ideas and aspirations • Accountability and responsibility • Good work habits • Self-awareness • Values and beliefs • Self-development • Financial literacy • Healthy lifestyle practices • Adopting safety practices	
2. Demonstrate interpersonal communication	• Meaning of interpersonal communication • Listening skills • Types of audience • Public speaking • Writing skills • Negotiation skills • Reading skills • Meaning of empathy • Understanding customers' needs • Establishing communication networks • Assertiveness • Sharing information	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

3. Demonstrate critical safe work habits	• Stress and stress management • Time concept • Punctuality and time consciousness • Leisure • Integrating personal objectives into organizational objectives • Resources mobilization • Resources utilization • Setting work priorities • Developing healthy relationships • HIV and AIDS • Drug and substance abuse • Managing emerging issues	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
4. Lead a workplace team	• Leadership qualities • Power and authority • Team building • Determination of team roles and objectives • Team parameters and relationships • Individual responsibilities in a team • Forms of communication • Complementing team activities • Gender and gender mainstreaming • Human rights • Developing healthy relationships • Maintaining relationships • Conflicts and conflict resolution	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

	• Coaching and mentoring skills	
5. Plan and organize work	• Functions of management • Planning • Organizing • Time management • Decision making concept • Task allocation • Developing work plans • Developing work goals/objectives and deliverables • Monitoring work activities • Evaluating work activities • Resource mobilization • Resource allocation • Resource utilization • Proactive planning • Risk evaluation • Problem solving • Collecting, analysing and organising information • Negotiation	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
6. Maintain professional growth and development	• Avenues for professional growth • Training and career opportunities • Assessing training needs • Mobilizing training resources • Licenses and certifications for professional growth and development • Pursuing personal and organizational goals • Managing work priorities and commitments • Recognizing career	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

	advancement	
7. Demonstrate workplace learning	• Managing own learning • Mentoring • Coaching • Contributing to the learning community at the workplace • Cultural aspects of work • Networking • Variety of learning context • Application of learning • Safe use of technology • Taking initiative/proactivity • Flexibility • Identifying opportunities • Generating new ideas • Workplace innovation • Performance improvement • Managing emerging issues • Future trends and concerns in learning	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
8. Demonstrate problem solving skills	• Critical thinking process • Data analysis tools • Decision making • Creative thinking • Development of creative, innovative and practical solutions • Independence in identifying and solving problems • Solving problems in teams • Application of problem-solving strategies • Testing assumptions • Resolving customer concerns	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

9. Manage ethical performance	• Meaning of ethics • Ethical perspectives • Principles of ethics • Ethical standards • Organization code of ethics • Common ethical dilemmas • Organization culture • Corruption, bribery and conflict of interest • Privacy and data protection • Diversity, harassment and mutual respect • Financial responsibility/accountability • Etiquette • Personal and professional integrity • Commitment to jurisdictional laws • Emerging issues in ethics	• Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

Suggested Methods of Instruction

- Demonstrations
- Simulation/Role play
- Group Discussion
- Presentations
- Assignments
- Q&A

Recommended Resources

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets

- LCD projectors

ENVIRONMENTAL LITERACY

UNIT CODE: CON/CU/ARC/BC/06/6/A

Relationship to Occupational Standards:
This unit addresses the Unit of Competency : Demonstrate Environmental Literacy

Duration of Unit: 40 hours

Unit Description
This unit describes the competencies required demonstrate environmental literacy.it involves controlling environmental hazard, controlling environmental pollution, complying with workplace sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs, monitoring activities on environmental protection/programs, analysing resource use and developing resource conservation plans.

Summary of Learning Outcomes
1. Control environmental hazard
2. Control environmental Pollution
3. Demonstrate sustainable resource use
4. Evaluate current practices in relation to resource usage
5. Identify Environmental legislations/conventions for environmental concerns
6. Implement specific environmental programs
7. Monitor activities on Environmental protection/Programs
8. Analyze resource use
9. Develop resource conservation plans

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Control environmental hazard	• Purposes and content of Environmental Management and Coordination Act 1999 • Storage methods for environmentally hazardous materials	• Written questions • Oral questions

	• Disposal methods of hazardous wastes • Types and uses of PPE in line with environmental regulations • Occupational Safety and Health Standards (OSHS)	
2. Control environmental Pollution control	• Types of pollution • Environmental pollution control measures • Types of solid wastes • Procedures for solid waste management • Different types of noise pollution • Methods for minimizing noise pollution	• Written questions • Oral questions • Role play
3. Demonstrate sustainable resource use	• Types of resources • Techniques in measuring current usage of resources • Calculating current usage of resources • Methods for minimizing wastage • Waste management procedures • Principles of 3Rs (Reduce, Reuse, Recycle) • Methods for economizing or reducing resource consumption	• Written questions • Oral questions • Role play
4. Evaluate current practices in relation to resource usage	• Collection of information on environmental and resource efficiency systems and procedures, • Measurement and recording of current resource usage • Analysis and recording of current purchasing strategies. • Analysis of current work processes to access information and data	• Written questions • Oral questions • Role play

	• Identification of areas for improvement	
5. Identify Environmental legislations/conventions for environmental concerns	• Environmental issues/concerns • Environmental legislations /conventions and local ordinances • Industrial standard /environmental practices • International Environmental Protocols (Montreal, Kyoto) • Features of an environmental strategy	• Written questions • Oral questions
6. Implement specific environmental programs	• Community needs and expectations • Resource availability • 5s of good housekeeping • Identification of programs/Activities • Setting of individual roles /responsibilities • Resolving problems /constraints encountered • Consultation with stakeholders	• Written questions • Oral questions • Role play
7. Monitor activities on Environmental protection/Programs	• Periodic monitoring and Evaluation of activities • Gathering feedback from stakeholders • Analyzing data gathered • Documentation of recommendations and submission • Setting of management support systems to sustain and enhance the program • Monitoring and reporting of environmental incidents to concerned /proper authorities	• Oral questions • Written tests • Practical test

8. Analyze resource use	• Identification of resource consuming processes • Determination of quantity and nature of resource consumed • Analysis of resource flow through different parts of the process. • Classification of wastes for possible source of resources.	• Written tests • Oral questions • Practical test
9. Develop resource Conservation plans	• Determination of efficiency of use/conversion of resources • Causes of low efficiency of use of resources • Plans for increasing the efficiency of resource use	• Written tests • Oral questions • Practical test

Suggested Methods of Instruction

- Instructor led facilitation of theory
- Practical demonstration of tasks by trainer
- Practice by trainees
- Observations and comments and corrections by trainers

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company environmental management systems (EMS)
- Montreal Protocol
- Kyoto Protocol

OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: CON/CU/ARC/BC/07/6/A

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Demonstrate Occupational Safety and Health Practices

Duration of Unit: 40 hours

Unit Description
This unit specifies the competencies required to demonstrate occupational health and safety practices. It involves identifying workplace hazards and risk, identifying and implementing appropriate control measures to hazards and risks and implementing OSH programs, procedures and policies/guidelines.

Summary of Learning Outcomes
1. Identify workplace hazards and risk
2. Control OSH hazards
3. Implement OSH programs

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify workplace hazards and risks	• Identification of hazards in the workplace and/or the indicators of their presence • Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace • Gathering of OSH issues and/or concerns	• Oral questions • Written tests • Portfolio of evidence • Third party report
2. Control OSH hazards	• Prevention and control measures e.g. use of PPE • Risk assessment • Contingency measures	• Oral questions • Written tests • Portfolio of evidence

		• Third party report
3. Implement OSH programs	• Company OSH program, evaluation and review • Implementation of OSH programs • Training of team members and advice on OSH standards and procedures • Implementation of procedures for maintaining OSH-related records	• Oral questions • Written tests • Portfolio of evidence • Third party report

Suggested Methods of Instruction

- Assigments
- Discussion
- Q&A
- Role play
- Viewing of related videos

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE) e.g.
    - Mask
    - Face mask/shield
    - Safety boots
    - Safety harness
    - Arm/Hand guard, gloves
    - Eye protection (goggles, shield)
    - Hearing protection (ear muffs, ear plugs)
    - Hair Net/cap/bonnet
    - Hard hat
    - Face protection (mask, shield)
    - Apron/Gown/coverall/jump suit
    - Anti-static suits
    - High-visibility reflective vest

COMMON UNITS OF LEARNING

APPLIED MATHEMATICS

UNIT CODE: CON/CU/ARC/CC/01/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply mathematical skills

Duration of Unit: 80 hours

Unit Description

This unit describes the competencies required by a technician in order to apply algebra, trigonometry and hyperbolic functions, complex numbers, coordinate geometry, carry out binomial expansion, apply calculus, solve ordinary differential equations, carry our mensuration, apply power series, statics, latitudes and longitudes, vector theory, matrix and Numerical methods.

Summary of Learning Outcomes

1. Apply Algebra
2. Apply Trigonometry and hyperbolic functions
3. Apply complex numbers
4. Apply Coordinate Geometry
5. Carry out Binomial Expansion
6. Apply Calculus
7. Solve Ordinary differential equations
8. Carry out Mensuration
9. Apply Power Series
10. Apply Statistics
11. Apply Latitudes and Longitudes
12. Apply Vector theory
13. Apply Matrix
14. Apply Numerical methods

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply Algebra	• Base and Index • Law of indices • Indicial equations	• Written tests • Oral questioning • Assignments

	• Laws of logarithm • Logarithmic equations • Conversion of bases • Use of calculator • Reduction of equations • Solution of equations reduced to quadratic form • Solutions of simultaneous linear equations in three unknowns • Solutions of problems involving AP and GP	• Supervised exercises
2. Apply Trigonometry and hyperbolic functions	• Half -angle formula • Factor formula • Trigonometric functions • Parametric equations • Relative and absolute measures • Measures calculation • Definition of hyperbolic equations • Properties of hyperbolic functions • Evaluations of hyperbolic functions Hyperbolic identities • Osborne's Rule • Ashx+bshx=C equation • One-to-one relationship in functions • Inverse functions for one-to-one relationship • Inverse functions for trigonometric functions • Graph of inverse functions • Inverse hyperbolic functions	• Written tests • Oral questioning • Assignments • Supervised exercises
3. Apply complex numbers	• Definition of complex numbers	• Assignments • Oral questioning

	• Stating complex numbers in numbers in terms of conjugate argument and • Modulus • Representation of complex numbers on the Argand diagram • Arithmetic operation of complex numbers Application of De Moivre's theorem • Application of complex numbers to engineering	• Supervised exercises • Written tests
4. Apply Coordinate Geometry	• Polar equations • Cartesian equation • Graphs of polar equations • Normal and tangents • Definition of a point • Locus of a point in relation to a circle • Loci of points for given mechanism	• Assignments • Oral questioning • Practical tests • Observation • Supervised exercises • Written tests
5. Carry out Binomial Expansion	• Binomial theorem Power series using binomial theorem Roots of numbers using binomial theorem. • Estimation of errors of small changes using binomial theorem	• Assignments • Supervised exercises • Written tests
6. Apply calculus	• Definition of derivatives of a function • Differentiation from fist principle • Tables of some common derivatives • Rules of differentiation • Rate of change and small change	• Assignments • Supervised exercises • Written tests

	• Stationery points of functions of two variables • Definition of integration • Indefinite and definite integral • Methods of integration application of integration. • Integrals of hyperbolic and inverse functions	
7. Solve Ordinary differential equations	• Types of first order differential equations • Formation of first order differential equation • Solution of first order differential equations • Application of first order differential equations • Formation of second order differential equations for various systems • Solution of second order differential equations • Application of second order differential equations	• Assignments • Oral questioning • Supervised exercises • Written tests
8. Carry out Mensuration	• Units of measurements • Perimeter and areas of regular figures • Volume of regular solids • Surface area of regular solids • Area of irregular figures • Areas and volumes using Pappus theorem	• Assignments • Supervised exercises • Written tests
9. Apply Power Series	• Definition of the term power series • Taylor's theorem	• Written tests • Assignments • Supervised exercises

	• Deduction of Maclaurin's theorem to obtain power series • Application of Taylor's theorem and Maclaurin's theorems in numerical work	

10. Apply Statistics	• Classification of data
	  • Grouped data
	  • Ungrouped data
	• Data collection
	• Tabulation of data
	  • Class intervals
	  • Class boundaries
	  • Frequency tables
	• Diagrammatic and graphical presentation of data e.g.
	  • Histograms
	  • Frequency polygons
	  • Bar charts
	  • Pie charts
	  • Cumulative frequency curves
	• Measures of central tendency mean, mode and median
	• Measures of dispersion
	  • Variance and standard deviation
	• Definition of probability
	• Laws of probability
	• Expectation variance and S.D.
	• Types of distributions
		• Oral questioning
		• Written tests
		• Assignments
		• Supervised exercises

	• Mean, variance and SD of probability distributions • Application of probability distributions • Standard normal tables • Sampling distributions • Rank correlation coefficient	
11. Apply Latitudes and Longitudes	• Latitudes and longitudes • The equator and the Greenwich meridian • Distance between two points along small and great circle • Time between longitude • speed	• Assignments • Oral questioning • Supervised exercises • Written tests
12. Apply Vector theory	• Vectors and scalar in two and three dimensions • Operations on vectors: Addition and Subtraction • Position vectors • Resolution of vectors	• Assignments • Oral questioning • Supervised exercises • Written tests
13. Apply Matrix methods	• Matrix operation • Determinant of 3x3 matrix • Inverse of 3x3 matrix • Solution of linear simultaneous equations in 3 unknowns • Application of matrices	• Assignments • Oral questioning • Supervised exercises • Written tests
14. Apply Numerical methods	• Definition of interpolation and extrapolation • Application of interpolation • Application of interactive methods to solve equations • Application of interactive methods to areas and volumes	• Assignments • Oral questioning • Supervised exercises • Written tests

Suggested Methods of Instruction

- Group discussions
- Demonstration by trainer
- Exercises by trainee

Recommended Resources

- Scientific Calculators
- Rulers, pencils, erasers
- Charts with presentations of data
- Graph books
- Dice
- Computers with internet connection

TECHNICAL DRAWING

UNIT CODE: CON/CU/ARC/CC/02/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Prepare and interpret technical drawings

Duration of Unit: 60 hours

Unit Description

This unit covers the competencies required to prepare and interpret technical drawings. It involves competencies to select, use and maintain drawing equipment and materials. It also involves producing plain geometry drawings, solid geometry drawings, pictorial and orthographic drawings of components and application of Computer Aided Design (CAD) packages.

Summary of Learning Outcomes

1. Use and maintain drawing equipment and materials
2. Produce plane geometry drawings
3. Produce solid geometry drawings
4. Produce pictorial and orthographic drawings of components
5. Apply CAD packages

Learning Outcomes, Content and Suggested Assessment Methods:

Learning Outcome	Content	Suggested Assessment Methods
1. Use and maintain drawing equipment and materials	• Identification and care of drawing equipment • Identification and care of drawing materials • Reference to manufacturer's instructions and work place procedures on use and maintenance of drawing equipment and materials • Reference to relevant environmental legislations • Use of Personal Protective Equipment (PPEs)	• Observation • Oral questioning • Written tests

2. Produce plane geometry drawings	• Types of lines in drawings • Construction of geometric forms e.g. squares, circles • Construction of different angles • Measurement of different angles • Bisection of different angles and lines • Standard drawing conventions • Ellipses • Tangents and circles • Polygons • Loci	• Oral questioning • Practical tests • Observation
3. Produce solid geometry drawings	• Interpretation of sketches and drawings of patterns e.g. cylinders, prisms and pyramids • Sectioning of solids e.g. prisms, cones • Development and interpenetrations of solids e.g. cylinder to cylinder and cylinder to triangular, prism	• Observation • Practical tests • Oral questioning
4. Produce orthographic drawings	• Meaning of pictorial and orthographic drawings • Meaning of sectioning • Meaning of symbols and abbreviations • Drawing and interpretation of orthographic elevations • Dimensioning of orthographic elevations • Sectioning of views	• Observation • Practical tests • Oral questioning
5. Produce pictorial drawings	• Meaning of pictorial drawings • Drawing objects in isometric view • Drawing objects in oblique view	• Observation • Oral questioning • Practical tests
6. Apply CAD packages	• Identification of CAD packages e.g. AutoCAD, circuit maker	• Observation • Oral questioning

	• Use of CAD packages in drawing of:
	  • Plane geometry
	  • Solid
	  • Orthographic
	  • Pictorial
		• Practical tests

Suggested Methods of Instruction

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions

Recommended Resources

- Drawing room
- Drawing instruments e.g. T-squares, set squares, drawing sets
- Drawing tables
- Pencils, papers, erasers
- Masking tapes
- Computers installed with relevant CAD packages

BUILDING MATERIALS SCIENCE

UNIT CODE: CON/CU/ARC/CC/03/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Building Materials Science

Duration of Unit: 100 Hours

Unit Description

This unit describes the competence in applying building materials science. It involves identifying essential and properties of construction materials, manufacturing construction materials, selecting quality construction materials, using construction materials properly, testing construction materials and handling construction materials safely.

Summary of Learning Outcomes

1. Identify essential construction materials
2. Identify properties of construction materials
3. Manufacture construction materials
4. Select quality construction materials
5. Use construction materials appropriately
6. Test construction materials
7. Handle construction materials safely

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify essential construction materials	• Engineering drawings interpretation • Bills of quantities • Construction materials	• Written tests • Oral questioning • Practical tests • Project
2. Identify properties of construction materials	• Physical properties of construction materials • Chemical properties of construction materials • Mechanical properties of construction materials	• Written tests • Oral • Practical tests/Project

3. Manufacture construction materials	• Raw materials used in manufacturing construction materials • Procedures of manufacturing construction materials • Plant and equipment used in manufacturing construction materials	• Written tests • Oral Questioning • Practical tests • Project
4. Select quality construction materials	• Properties of quality construction materials • Construction materials Cost and quality relationship • Selection of Construction materials	• Written tests • Oral Questioning • Practical tests • Project
5. Use construction materials appropriately	• Construction methods and processes • Appropriate use of construction materials	• Written tests • Oral questioning • Practical tests • Project

6. Test construction materials	• Materials testing parameters
	  • Destructive tests
	  • Non-destructive tests
	• Materials testing procedures
	• Quality assurance and control
		• Written tests
		• Oral Questioning
		• Practical tests
		• Project

7. Handle construction materials safely	• User safety in handling construction materials • Construction Materials handling and storage	• Written tests • Oral Questioning • Practical tests • Project

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Field trips
- Trainee group discussions

Recommended Resources

Tools and equipment

- Computer
- Laboratory testing equipment
- Laboratory apparatus
- Hand tools
- Machine tools

Materials and supplies

- Computer software
- Construction materials
- Computers
- Stationery
- Manufacturer's catalogues

Personal protective equipment (PPEs)

- Safety boots
- Goggles
- Gas masks
- Helmets
- Gloves
- Dust coats
- First aid kit
- Ear muffs
- Dust masks
- Overalls

WORKSHOP TECHNOLOGY PRACTICES

UNIT CODE: CON/CU/ARC/CC/04/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Workshop Technology Practices

Duration of Unit: 60 Hours

Unit Description

This unit describes the competence in applying workshop technology practices. It entails performing masonry, plumbing and carpentry tasks. It also involves performing electrical and mechanical operations.

Summary of Learning Outcomes

1. Perform masonry tasks
2. Perform plumbing tasks
3. Perform carpentry tasks
4. Perform electrical operations
5. Perform mechanical operations

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Perform masonry tasks	• Masonry workshop safety requirements • Masonry hand tools • Masonry machine tools • Maintenance of masonry tools • Use of masonry tools	• Written tests • Oral Questioning • Practical tests • Project
2. Perform plumbing tasks	• Plumbing workshop safety requirements • Plumbing hand tools • Plumbing machine tools • Maintenance of Plumbing tools • Use of Plumbing tools	• Written tests • Oral Questioning • Practical tests • Project

3. Perform carpentry tasks	• Carpentry workshop safety requirements • Carpentry hand tools • Carpentry machine tools • Maintenance of Carpentry tools • Use of Carpentry tools	• Written tests • Oral Questioning • Practical tests • Project
4. Perform electrical operations	• Electrical workshop safety requirements • Measurement of electrical quantities • IEE regulations • Electrical conventional tools • Installation of basic electrical circuits • Renewable energy • Power supply	• Written tests • Oral Questioning • Practical tests • Project
5. Perform mechanical operations	• Mechanical workshop safety requirements • Mechanical hand tools • Use of mechanical tools • Diesel and petrol engines • Water pumps • Maintenance of engines and water pumps	• Written tests • Oral Questioning • Practical tests • Project

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Field trips
- Trainee group discussions

Recommended Resources

Tools and equipment

- Masons trowel
- Wood float

- Cold chisels
- Masons square
- Spade
- Shovel
- Plumb bob
- Concrete mixer
- Block cutter
- Vibrator
- Pneumatic hammer
- Compactors
- Bench shears
- Anvil
- Pipe wrench
- Pliers
- Bending machine
- Welding
- Sheet metal holding machine
- Portable power drill
- Saws
- Planes
- Hammer
- Carpenter square
- Marking gauges
- Hand drill
- Screw drivers
- circular saw
- Thicknesser
- Portable sander
- Close cut saw
- Portable drill machine
- phase tester
- screw driver
- pliers
- long nose
- side cutter
- draw in wire
- electrical knife
- electrical hammer
- Arc welding shields
- Leather gloves
- Chipping hammers
- Welding goggles

- Tongs
- Hand vices
- Mole punch
- Pliers
- Centrifugal
- Submersible
- Reciprocating pump
- Hand pumps
- Hand grinder

Materials and supplies

- Lumber
- PPR pipes
- PVC pipes
- GI pipes
- Pipe fittings
- Cement
- Sand
- Lime
- Sheet metal
- Steel plates
- Electrical materials
- Electrical appliances
- Plumbing appliances
- Fuel
- Grease
- Oil
- Filters

Personal protective equipment (PPEs)

- Helmets
- Gloves
- Safety goggles
- Safety boots
- Overalls
- Dust masks
- Gas masks
- Dust coats

BUILDING TECHNOLOGY AND SERVICES

UNIT CODE: CON/CU/ARC/CC/05/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply principles of building technology and services

Duration of Unit: 200 hours

Unit Description

This unit describes the competencies required to survey construction site, prepare construction site, construct substructure, construct superstructure, perform mechanical works, install electrical works, prepare reinforced concrete, produce building elements, apply building finishes and fittings and perform landscaping

Summary of Learning Outcomes

1. Survey construction site
2. Prepare construction site
3. Construct substructure
4. Construct superstructure
5. Perform mechanical works
6. Install electrical works
7. Prepare reinforced concrete
8. Produce building elements
9. Apply building finishes and fittings
10. Perform landscaping
11. Perform building maintenance operations

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Survey construction site	• Principles of survey • Profiles • Contours • Maps • Survey equipment and tools • Significance of site investigation	• Observation • Oral questioning • Written tests • Projects practical assessments

	• Site investigation procedure
	• Site investigation elements/areas
	  • Soil
	  • Existing structures/services
	  • Labour and construction materials
	• Reconnaissance
	• Levelling
	• Vertical controls
	• Trial pits	

2. Prepare construction site	• Occupational health and safety precautions
	• Hoarding erection
	• Site clearance
	  • Methods of site clearance
	  • Tools and equipment used in site clearance
	  • Safety issues in site clearance
	• Setting out of building
	• Excavation procedures
	  • Methods of excavation
	  • Temporary support to excavations
	  • Groundwater control
		• Observation
		• Oral questioning
		• Written tests
		• Projects practical assessments

3. Construct substructure	• Site clearance
	  • Methods of site clearance
	  • Tools and equipment used in site clearance
	  • Safety issues in site clearance
	• Excavation
	  • Methods of excavation
	  • Temporary support to excavations
	  • Groundwater control
	• Methods used in levelling
		• Observation
		• Oral questioning
		• Written tests
		• Projects practical assessments

	• Cut • Fill • Cut and fill • Profile boards • Types of profile boards • Corner profile boards • Single profile boards • Use of profile boards • Foundations • Types of foundations • Materials used in construction of foundations • Hard core • Functions of hard core • Materials used • Characteristics of hard core material • Blinding • Functions of blinding • Materials used • Characteristics of blinding materials • Anti-termite treatment • Significance of anti-termite treatment • Chemicals used for anti-termite treatment • Safety precautions in chemical handling • Damp proofing • Significance of damp proofing • Materials used in damp proofing • Characteristics of damp proofing materials • Concrete bed construction • Mass concrete • Reinforced concrete	

4. Construct superstructure	• Setting out superstructure works
	• Superstructure concrete works
	  • Concrete in columns
	  • Concrete in suspended slabs and beams
	  • Formwork
	  • Reinforcement
	  • Curing of concrete
	• Superstructure walling
	  • Forms of wall construction
	  • Types of walls
	  • Materials used in wall construction
	  • Tools and equipment used in wall construction
	  • Damp proofing in walls
	• Roof construction
	  • Functional requirements of roofs
	  • Materials used in roof construction
	  • Types of roofs
	  • Parts of a roof
	  • Roof construction procedure
	• Roof cover
	  • Types of roof cover materials
	  ▪ Traditional roof cover
	  ▪ Modern roof cover
	  • Functional requirements of roof covers
	  • Roof underlays
	  • Roof cover laying procedure
	  ▪ Tiles
	  ▪ Concrete
	  ▪ Sheets
	• Rain water goods installation
	  • Gutter
	  • Downpipes
		• Observation
		• Oral questioning
		• Written tests
		• Projects practical assessments

	• Channels	
5. Perform mechanical works	• Pipework • service ducts • HVAC (Heating Ventilation Air Conditiong)	• Observation • Oral questioning • Written tests • Projects practical assessments
6. Install electrical fittings	• Safety precautions • Electrical conduits • socket boxes • Electrical conduits tests	• Observation • Oral questioning • Written tests • Projects practical assessments
7. Prepare reinforced concrete	• Preparation of Formwork • Steel fixing • Concreting procedures	• Observation • Oral questioning • Written tests • Projects practical assessments
8. Produce building elements	• Production of precast concrete • Timber components • Metal components • Stabilized soil components	• Observation • Oral questioning • Written tests • Projects practical assessments

9. Apply building finishes and fittings	• Types of building finished
	• Methods of finishes application
	• Finishes application procedures
	  • Tiles
	  • Paints
	  • Parquets
	  • Facing
	  • Pebble dash
	  • Plaster
	  • Render
	  • Floor screed
	  • Granolithic finish
	  • Terrazzo
		• Observation
		• Oral questioning
		• Written tests
		• Projects
		• practical assessments

	• Cladding	
10. Perform landscaping	• Ground preparations • Setting out of pathways and driveways • Plants and vegetation establishment • Laying of pathways and driveways	• Observation • Oral questioning • Written tests • Projects • practical assessments
11. Perform building maintenance operations	• Principles of maintenance operations • Building maintenance procedures • Building faults/defects •	• Observation • Oral questioning • Written tests • Projects practical assessments

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions

Recommended Resources

Tools and equipment

- Excavating tools and equipment
- Profile boards
- Wheelbarrows
- Trowels
- Spirit levels
- Mason squares
- Steel floats
- Motor boards
- Plumb bob
- Steel bending and fixing tools/machines
- Concrete mixers

- Spades
- Sprayer
- Painting brushes
- Levelling equipment

Materials and supplies

- Cement
- Water
- Sand
- Ballast
- Reinforcement bars
- Paint
- Tiles
- Terrazzo
- Sheets
- Timber
- Steel
- Damp proofing materials
- Stones
- Bricks
- Murram
- Manufactured boards
- Glass
- Plastic

Personal protective equipment (PPEs)

- Dust coat
- Overall
- Helmet
- Safety boots
- Gloves
- First aid kit
- Goggles
- Dust masks

HISTORY OF ARCHITECTURE

UNIT CODE: CON/CU/ARC/CC/06/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply history of Architecture

Duration of Unit: 100 Hours

Unit Description

This unit describes the competence required to apply prehistoric and ancient building technology, classical building technology, apply neo-classism building technology and apply modernism and postmodernism building technology

Summary of Learning Outcomes

1. Apply prehistoric and ancient building technology (11600BC-476AD)
2. Apply classical building technology (527AD-1790)
3. Apply neo-classism building technology (1730-1937)
4. Apply modernism and postmodernism building technology (1900-present)

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply prehistoric and ancient building technology (11600BC-900BC)	• Stone age • Ancient Egypt	• Written tests • Oral Questioning • Drawings/sketches
2. Apply classical building technology (1850BC- 1790)	• Greek • Roman • Indian • South East Asia • Byzantine • Romanesque • Gothic • Renaissance	• Written tests • Oral Questioning • Drawings/sketches

	• Baroque • Rococo	
3. Apply neo-classism building technology (1730-1937)	• Arts and craft movement • Neo-classism art nouveou • Beaux art • Neo-gothic • Art deco	• Written tests • Oral Questioning • Drawings/sketches
4. Apply modernism and postmodernism building technology (1900-present)	• Modernist styles • Bauhaus • Surrealism • Cubism • Scandinavian • Bohemian • Mid-modern century • Post-modernism • Contemporary • Minimalistic • History of Kenyan Architecture	• Written tests • Oral Questioning • Drawings/sketches

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Field trips
- Trainee group discussions

Recommended Resources

- Research material
- Computers
- Internet
- Historical books

STRUCTURAL DESIGN

UNIT CODE: CON/CU/ARC/CC/07/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply principles of Structural design

Duration of Unit: 200 hours

Unit Description

This unit describes the competencies required to analyze structural principles, evaluate design materials, design structural elements and select optimal design.

Summary of Learning Outcomes

1. Analyze structural principles
2. Evaluate design materials
3. Design structural elements
4. Select optimal design

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Analyze structural principles	• Principles of structural Analysis
	  • Equilibrium
	  • Geometric stability
	  • Strength and rigidity
	• Relationship between structural form and structural efficiency
		• Observation
		• Oral questioning
		• Written tests
		• Projects
		• practical Tests

2. Evaluate design materials	• Structural materials
	  • Masonry
	  • Timber
	  • Steel
	  • Concrete
	  • Composite materials
	  • Plastic
	  • Glass
		• Observation
		• Oral questioning
		• Written tests
		• Practical Tests

	• Material testing.	

3. Design structural elements	• Structural elements and their designs
	  • Columns
	  • Beams
	  • Trusses
	  • Plates
	  • Shells
	  • Arches
		• Observation
		• Oral questioning
		• Written tests
		• Projects
		• practical Tests

4. Select optimal design	• Critical appraisal of structures • Complexity and efficiency in structural design • Reading a building as a structural object • Mode of failure	• Observation • Oral questioning • Written tests • Projects • practical Tests

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions
-

Recommended Resources

Tools and equipment

- Excavating tools and equipment
- Profile boards
- Wheelbarrows
- Trowels
- Spirit levels
- Mason squares
- Steel floats
- Motor boards
- Plumb bob
- Steel bending and fixing tools/machines

- Concrete mixers
- Spades
- Levelling equipment

Materials and supplies

- Cement
- Water
- Sand
- Ballast
- Reinforcement bars
- Sheets
- Timber
- Steel
- Damp proofing materials
- Stones
- Bricks
- Murram
- Manufactured boards
- Glass
- Plastic
- Composite materials

Personal protective equipment (PPEs)

- Dust coat
- Overall
- Helmet
- Safety boots
- Gloves
- First aid kit
- Goggles
- Dust masks

CORE UNITS OF LEARNING

ARCHITECTURAL PROJECT DESIGN

UNIT CODE: CON/CU/ARC/CR/01/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Design and detail architectural projects

Duration of Unit: 240 hours

Unit Description

This unit describes the competencies required to prepare a design brief, conduct site analysis, conduct literature review, carry out case study, perform activity study, prepare design brief, produce schematic drawings, prepare presentation drawings, prepare working drawings, prepare details drawings, revise working drawings and apply CADD in architectural work

Summary of Learning Outcomes

1. Prepare a design brief
2. Conduct site analysis
3. Conduct literature review
4. Carry out case study
5. Prepare design concept
6. Produce schematic drawings
7. Prepare presentation drawings
8. Prepare spatial brief
9. Prepare working drawings
10. Prepare details drawings
11. Revise working drawings
12. Apply CADD in architectural work

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare a design brief	• Design requirements • Client's requirements • Client's cost expectation • Local building regulations	• Observation • Oral questioning • Drawings and sketches • Practical Tests

2. Conduct site analysis	• Survey maps
	• Data collection
	  • Site plans
	  • Site location maps
	  • Access routes and structures
	  • Utilities
	  • Topography
	  • Photographic evidence
	• Site inventory
	• Site analysis report / SWOT Analysis
		• Observation
		• Oral questioning
		• Written tests
		• Practical assessments

3. Conduct literature review	• History of Architecture • Research • Evolution of construction material • Historical backgrounds of projects	• Observation • Oral questioning • Written tests/ sketches
4. Carry out case study	• Meaning of case study • Importance of a case study • Local case studies • International case studies • Historical background of case studies • SWOT Analysis of case studies	• Observation • Oral questioning • Written tests/drawings and sketches • Practical Tests
5. Prepare design concept	• Meaning and importance of a design concept • Preparation of conceptual sketches • Preparation of a conceptual model	• Observation • Oral questioning • Sketches • Practical tests
6. Prepare spatial brief	• Meaning and importance of a spatial brief • Furniture requirements • Anthropometric and ergonomics studies • Computation of Spatial areas	• Observation • Oral questioning • Written tests/tables/drawings and sketches • Practical tests

	• Preparation of a spatial brief (accommodation schedule)	
7. Produce schematic drawings	• Meaning of schematic drawings • Preparation of Bubble diagrams • Formulation of proportional sketches • Preparation of a sketch models • Determination of cost estimates • Viability of design	• Observation • Oral questioning • Sketches/ drawings/ models • Practical Tests

8. Prepare presentation drawings	• Meaning of presentation drawings
	• Content of presentation drawings
	  • Plans
	  • Elevations
	  • 3D models
	• Format of presentation drawings
	  • Models
	  • Drawings
	  • Soft copy
	• Dimensioning
	• Artistic impressions
		• Observation
		• Oral questioning
		• Drawings and sketches
		• Practical Tests

9. Prepare working drawings	• Meaning and purpose of working drawings • Content of working drawings • Dimensions and labels • Preparation of door and window schedules • Indication of finishing materials and codes on the working drawing • Preparation of a detailed site plan • Local government regulations	• Observation • Oral questioning • Drawings • Practical Tests

	• Plotting drawing on a tracing paper • Production of drawing on blueprint • Preparation of bill of quantities • Preparation of a works program	

10. Prepare details drawings	• Integration of engineering drawings into the details drawings
	• Production of scaled details
	• Meaning and importance of details drawings
	• Format and content of details drawing
	• Detail drawings
	  • Roofs
	  • Walls
	  • Floors
		• Observation
		• Oral questioning
		• Drawings
		• Practical Testsi8i

11. Revise working drawings	• Meaning and importance of revising working drawings • Incorporation of additions and alterations in the working drawings • Presentation of revised working drawings • Local authorities • Occupational certificate	• Observation • Oral questioning • Drawings • Practical assessments

12. Apply CADD in architectural work	• Production of architectural drawings using design software
	  • Sketch
	  • Presentation drawing
	  • Working drawing
	  • Detail drawing
	• Detail drawing plotting on a tracing paper
	• Detail drawing production on blueprint
		• Observation
		• Oral questioning
		• Projects
		• Practical assessments

	• Building information management (BIM) systems	

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions
- Group projects

Recommended Resources

- Drawing paper
- Stationery
- Data
- Measuring tools
- Design software
- Computers
- Tracing paper
- Internet
- Transportation
- Cameras

ARCHITECTURAL PERSPECTIVES

UNIT CODE: CON/CU/ARC/CR/02/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Produce architectural perspectives

Duration of Unit: 60 hours

Unit Description

This unit describes the competencies required to prepare freehand internal perspectives, prepare freehand external perspectives, produce pictorial views, apply CAD in preparing perspectives and produce walkthrough videos

Summary of Learning Outcomes

1. Prepare freehand internal perspectives
2. Prepare freehand external perspectives
3. Produce pictorial views
4. Apply CAD in preparing perspectives
5. Produce walkthrough videos

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare freehand internal perspectives	• Internal Perspective drawing design • Detailing • Proportion and scale • Distance indication • Ariel perspective	• Observation • Oral questioning • Pictorials
2. Prepare freehand external perspectives	• External perspective drawing design • Proportion and scale • Distance indication • Ariel perspective	• Observation • Oral questioning • Pictorials
3. Produce pictorial views	• Axonometric views • Isometric views • Orthographic views	• Observation • Oral questioning

	• Perspectives • Grid • Orthogonal geometry • Projections • Scales	• Pictorials
4. Apply CAD in preparing perspectives	• Rendering software • Computer generated renderings • Presentation layouts	• Observation • Oral questioning • Pictorials

5. Produce walkthrough videos	• Camera set up
	• Generation of walkthroughs
	  • Interior walkthroughs
	  • Exterior walkthroughs
	• Audios
		• Observation
		• Oral questioning
		• Videos

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions
- Gropu projects

Recommended Resources

- Rendering software
- Projectors
- Stationery
- Camera
- Drawing paper
- Computers
- Measuring tools
- Internet

ARCHITECTURAL MODELLING

UNIT CODE: CON/CU/ARC/CR/03/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Produce architectural models

Duration of Unit: 100 hours

Unit Description

This unit describes the competencies required to produce schematic, digital and physical models

Summary of Learning Outcomes

1. Produce schematic/sketch models
2. Produce physical model
3. Produce digital models

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Produce schematic/sketch models	• Rough sketches • Design formulation • Preparation of a schematic model	• Observation • Oral questioning • Practical assessments

2. Produce physical model	• Tools, materials and equipment
	• Scales
	• Construction of physical models
	  ◦ Interior design
	  ◦ Building
	  ◦ Architectural landscaping
	• Detailed models
	  ◦ Stair cases
	  ◦ Ramps
	  ◦ Windows
	  ◦ Doors
	  ◦ Roofs
		• Observation
		• Oral questioning
		• Practical assessments

3. Produce digital models	• Presentation drawings • Rendering/generating presentation drawings using CAD software	• Observation • Oral questioning • Pictorials/videos • Practical assessments

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions

Recommended Resources

- Rendering software
- Computers
- Printing paper
- Measuring tools
- Modelling boards
- Wood
- Stationery
- Modelling stationery

ARCHITECTURAL COST AND ESTIMATES

UNIT CODE: CON/CU/ARC/CR/04/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Cost architectural projects

Duration of Unit: 100 hours

Unit Description

This unit describes the competencies required to take off building components, abstract take off data, work up dimensions, prepare schedule of materials, prepare bill of quantities/ estimates, schedules and valuations and compute project costs.

Summary of Learning Outcomes

1. Take off building quantities
2. Abstract take off data
3. Work up dimensions
4. Prepare bill of quantities/ estimates
5. Prepare schedule of materials
6. Prepare valuations of work done
7. Compute project variation costs

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Take off building quantities	• Principles of measurement • Standard methods of measurement of building and associated civil works (SMM) and civil engineering standard method of measurements CESMM) • Preparation of dimension sheet/paper • Preparation of list of items to measure	• Observation • Oral questioning • Written tests/ worksheets • Projects • practical assessments

	• Computing building/civil works quantities • Booking of dimensions • Booked items description	

2. Abstract take off data	• Abstracting sheet
	  • Preparation of abstracting sheet
	  • Transfer of booked quantities
	• Running through dimensions
	  • Symbols used in running through dimensions
	❑ Casting Up Dimensions
	  • Symbols Used in casting up and running through
		• Observation
		• Oral questioning
		• Written tests
		• Projects
		• practical assessments

3. Work up dimensions	• Timesing of dimensions • Squaring of booked dimensions • Computation in the abstract sheets	• Observation • Oral questioning • Written tests • Projects practical assessments

4. Prepare bill of quantities/ estimates	• Principles of billing
	• Billing paper/sheet
	  • Preparation of billing sheet/paper
	  • Transfer of booked quantities
	  • Price bill of quantities
	• Method statement
		• Observation
		• Oral questioning
		• Written tests
		• Projects
		• practical assessments

5. Prepare schedule of materials	• Types of materials and equipment • Quantification of building materials on a standard schedule • Quoted rates	• Observation • Oral questioning • Written tests • Projects • practical assessments

6. Prepare valuations of work done	• Valuation of Work done • Preparation of Payment certificates • Valuation of variations/ appraisals/ modifications	• Observation • Oral questioning • Written tests • Projects • practical assessments
7. Compute project costs	• Unit rates • Building up unit rates • Computation of Total cost • Computation of variation cost. • Preparation of change order	• Observation • Oral questioning • Written tests • Projects • practical assessments

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions

Recommended Resources

- Dimension sheets
- Abstract sheets
- Billing sheets
- Measuring tools
- Computers
- Office equipment
- Calculators
- Computer software
- CESSM/SMM
- Stationer
- Dust coat
- First aid kit

ARCHITECTURAL LANDSCAPING

UNIT CODE: CON/CU/ARC/CR/05/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: landscape architectural projects

Duration of Unit: 60 hours

Unit Description

This unit describes the competencies required to prepare landscaping designs, prepare schedule of landscaping elements, and prepare ground for landscaping, set out landscape design and install landscape design.

Summary of Learning Outcomes

1. Prepare landscaping designs
2. Prepare schedule of landscaping elements
3. Prepare ground for landscaping
4. Set out landscape design
5. Install landscape design

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare landscaping designs	• Meaning and importance of landscaping • Types of landscape materials • Inventory and analysis of the biophysical environment/ site • Human community inventory and analysis • Objective qualities and subjective qualities of the project. • Literature review • Case studies • Development of concepts • Integration of existing plan	• Observation • Oral questioning • Drawings and sketches • Pictorials • Videos • Written tests • Projects practical assessments

	• Landscape design procedures
	  • Spatial brief
	  • Schematic drawings
	  • Presentation drawings
	  • Working drawings
	  • Detail drawings
	• Apply CAD in landscape design	

2. Prepare schedule of landscaping elements	• Types of equipment • Numbering of landscaping elements on a standard schedule. • Quoted rates / bill of quantities	• Observation • Oral questioning • Written tests • Practical Tests
3. Prepare ground for landscaping	• Determination of area of the space • Ground clearance • Levelling/ grading	• Observation • Oral questioning • Drawings • Practical Tests
4. Set out landscape design	• Setting out procedures • Landscape design layout • Landscaping dimensions	• Observation • Oral questioning • Practical Tests

5. Install landscape design	• Plant installation
	  • Grass
	  • Shrubs
	  • Trees
	  • Ground cover
	• Drainage systems
	• Irrigation systems
	• Lighting
	• Fencing and gates
	• Paving
	• Beautification
	• Water systems
	• Electrical installation
		• Observation
		• Oral questioning
		• Drawings
		• Projects
		• practical assessments

Suggested Methods of Instruction

- Demonstration by trainer

- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions

Recommended Resources

- Design and rendering software
- Computers
- Survey tools
- Farm tools
- Landscaping materials
- Measuring tools
- Transportation
- Internet

BUILDING FINISHES AND FITTINGS

UNIT CODE: CON/CU/ARC/CR/06/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Install building finishes and fittings

Duration of Unit: 100 hours

Unit Description

This unit describes the competencies required to apply wall finishes, install doors, windows and openings, fix floor finishes, apply paint, and install furniture, fittings and ceilings

Summary of Learning Outcomes

1. Apply wall finishes
2. Install doors and windows
3. Fix floor and surface finishes
4. Apply paint
5. Install furniture and fittings
6. Install ceilings

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply wall finishes	• Types of wall finishes • Application procedures of wall finishes	• Observation • Oral questioning • Written tests/ drawings/ pictorials • Practical assessments
2. Install doors and windows	• Preparation of opening schedules and design • Layout marking • Frames • First fixing • Installation of doors /windows	• Observation • Oral questioning • Written tests • Projects practical assessments

	• Second fixing • Door and window accessories	
3. Fix floor and surface finishes	• Types of floor finishes • Preparation of floor surfaces • Installation of floor finishes	• Observation • Oral questioning • Practical assessments
4. Apply paint	• Types of paints • Preparation of Base surfaces • Preparation of Paint mix and varnish • Paint application procedures • Common painting defects • Maintenance of paint	• Observation • Oral questioning • Practical assessments • Projects
5. Install furniture and fittings	• Types of furniture • Types of fittings • Furniture layouts • Installation of Furniture • Installation of fittings	• Observation • Oral questioning • Drawings and models
6. Install ceilings	• Types of ceiling materials • Types of ceiling designs • Ceiling installation procedures • Ceiling fixtures.	• Observation • Oral questioning • Projects practical assessments

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions

Recommended Resources

- Levels
- Finishes and fittings
- Paint

- Measuring tools
- Protective gear (PPEs)

ALTERNATIVE BUILDING TECHNOLOGY

UNIT CODE: CON/CU/ARC/CR/07/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply alternative building technology

Duration of Unit: 60 hours

Unit Description

This unit describes the competencies required to construct using EPS (expanded polystyrene systems), interlocking blocks, concrete prefabricated wall panels, metal panels, timber panels, plastic and glass panels and traditional construction materials.

Summary of Learning Outcomes

1. Construct using EPS (expanded polystyrene systems)
2. Construct using interlocking blocks
3. Construct using concrete prefabricated walls
4. Construct using metal panels
5. Construct using timber panels
6. Construct using glass panels
7. Construct plastic panels
8. Construct using traditional construction materials

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Construct using EPS (expanded polystyrene systems)	• EPS materials
	• Characteristics of EPS materials
	• Functional requirements of EPS
	• Construction procedures using EPS
	  • Wall panels
	  • Floor panels
	• Finishes for EPS
	• Maintenance of EPS
	• Modular coordination
	• Dimensional control
	• Specifications
		• Observation
		• Oral questioning
		• Written tests
		• Drawings/ sketches/ pictorials
		• Models
		• Projects

2. Construct using interlocking blocks	• Types of interlocking blocks
	  • Soil blocks
	  • Concrete blocks
	  • Bricks
	• Characteristics of interlocking blocks
	• Manufacturing procedures for interlocking blocks
	• Functional requirements of interlocking blocks
	• Construction procedures using interlocking blocks
	• Dry stacking method
	• Finishes for interlocking blocks
	• Maintenance/repair of interlocking blocks
	• Modular coordination
	• Dimensional control
	• Specifications
		• Observation
		• Oral questioning
		• Models
		• Written tests
		• Drawings/ sketches/ pictorials
		• Models
		• Projects

3. Construct using concrete prefabricated wall panels	• Precast concrete
	  • Hollow blocks
	  • Channel
	  • Waffles
	• Placing of prefab units
	  • Formwork
	• Construction procedures using concrete prefab walls
	  • Reinforcement
	  • British Reinforced Concrete (BRC) mesh
	  • Casting
	  • Curing
	• Functional requirements of prefabricated units
	• Modular coordination
	• Dimensional control
	• Specifications
		• Observation
		• Oral questioning
		• Written tests
		• Drawings/ sketches/ pictorials
		• Models
		• Projects

4. Construct using metal panels	• Types of metal • Metal frames • Metal joints • Construction using metal panels • Functional requirements of metal panels • Finishes for metal panels • Maintenance of metal panels • Modular coordination • Dimensional control • Specifications	• Observation • Oral questioning • Written tests • Drawings/ sketches/ pictorials • Models • Projects
5. Construct using timber panels	• Types of timber • Timber frames • Timber joints • Treatment of timber • Construction using timber panels • Functional requirements of timber • Finishes for timber panels • Maintenance of timber panels • Modular coordination • Dimensional control • Specifications	• Observation • Oral questioning • Written tests • Drawings/ sketches/ pictorials • Models • Projects

6. Construct using glass panels	• Types of glass
	• Framing
	• Glass blocks
	• Joints
	• Glass panels polishing
	• Construction using glass panels
	• Functional requirements of glass
	• Finishes for glass panels
	  • Polishing
	  • Tinting
	• Maintenance of glass panels
	• Modular coordination
		• Observation
		• Oral questioning
		• Written tests
		• Drawings/ sketches/ pictorials
		• Models
		• Projects assessments

	• Dimensional control • Specifications	
7. Construct using plastic panels	• Types of plastics • Framing • Joints • Construction using plastic panels • Functional requirements of plastics • Finishes for plastic panels • Maintenance of plastic panels • Modular coordination • Dimensional control • Specifications	• Observation • Oral questioning • Written tests • Drawings/ sketches/ pictorials • Models • Projects assessments

8. Construct using traditional construction materials	• Types of traditional construction materials
	  • Grass
	  • Makuti
	  • Mud blocks
	  • Bamboo
	  • Mazeras
	  • Mud and wattle
	  • Hides and skins
	  • Strings
	  • Coral stones
	• Functional requirements
	• Finishes
	• Maintenance
	• Dimensional control
		• Observation
		• Oral questioning
		• Written tests
		• Drawings/ sketches/ pictorials
		• Models
		• Projects assessments

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions

Recommended Resources

- EPS (expanded polystyrene systems)
- Interlocking blocks
- Irish koto panels
- Concrete prefabricated wall panels
- Metal panels
- Timber panels
- Glass panels
- Transportation

CONSTRUCTION SITE MANAGEMENT

UNIT CODE: CON/CU/ARC/CR/08/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Manage Construction site

Duration of Unit: 60 hours

Unit Description

This unit describes the competencies required to manage project statutory approval, manage projects human resource, interpret building contract documents, organize construction site, review construction work plan, manage project expenditures, monitor site activities, coordinate quality standards and keep site records

Summary of Learning Outcomes

1. Manage project statutory approval process
2. Manage projects human resource
3. Interpret building contract documents
4. Organize construction site
5. Review construction work plan
6. Manage project expenditures
7. Conduct material management
8. Monitor site activities
9. Coordinate quality standards
10. Keep site records

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Manage project statutory approval process	• Principles of plan approval process
	• Development approval procedures
	  • County government
	  • NEMA
	  • OSHA
	  • NCA
		• Observation
		• Oral questioning
		• Written tests
		• Projects

2. Manage projects human resource	• Principles of management
	• Functions of management
	  • Plan
	  • Coordinate
	  • Control
	  • Command
	  • Organize
	• Principles and functions of organization
	• Occupational health, safety and welfare
	• Projects roles and responsibilities
	• Preparation of attendance register
	• Development of a project team
		• Observation
		• Oral questioning
		• Written tests
		• Projects

3. Interpret building contract documents	• Building contract documents • Interpretation of building contracts • Tendering process	• Observation • Oral questioning • Projects
4. Organize construction site	• Evaluation of construction site plan • Site arrangement • Site infrastructure and traffic routes • Site plant and equipment • Site installations	• Observation • Oral questioning • Written tests • Projects
5. Review construction work plan	• Preparation of projects time schedule • Projects scope of work • Projects work equipment allocation	• Observation • Oral questioning • Written tests • Projects

6. Manage project expenditures	• Determination of project scope of work • Project activities • Project materials • Rates of labour and materials • Determination of project total cost.	• Observation • Oral questioning • Written tests • Projects
7. Conduct material management	• Quantity of materials • Material storage • Material re-order • Material portioning	• Observation • Oral questioning • Written tests • Projects
8. Monitor site activities	• Construction requirements and approvals • Construction activities progress • Performance standards • Analysis of project status/task performance • Efficiency and effectiveness of site activities • Preparation of Method statement for works • Site meetings and inspections • Project report and results	• Observation • Oral questioning • Written tests • Projects
9. Coordinate quality standards	• Quality standard manuals • Proper construction methods • Quality tests • Site work progress • Qualified staffing • Quality equipment and tools	• Observation • Oral questioning • Written tests • Projects practical assessments

10. Keep site records	• Record parameters • Data entry methods • Regular updates of records • Maintenance of records • Storage of records	• Observation • Oral questioning • Written tests • Projects practical assessments

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions

Recommended Resources

- Inventory
- Stationery
- Transportation
- Internet