



REPUBLIC OF KENYA

COMPETENCY BASED CURRICULUM

FOR

PLUMBING

LEVEL 5



TVET CDACC
P.O. BOX 15745-00100
NAIROBI

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Council Secretary/CEO

TVET Curriculum Development, Assessment and Certification Council

P.O. Box 15745–00100

Nairobi, Kenya

Email: info@tvetcdacc.go.ke

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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 programs.

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 labor force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Construction Sector Skills Advisory Committee (SSAC), CAP Youth Empowerment Institute and Kenya Youth Employment and Skills 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 delivery methods, 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 appreciate CAP Youth Empowerment Institute, Kenya Youth Employment and Skills and Construction Sector Skills Advisory Committee (SSAC) who enabled the development of this curriculum.

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 perform their work more efficiently.

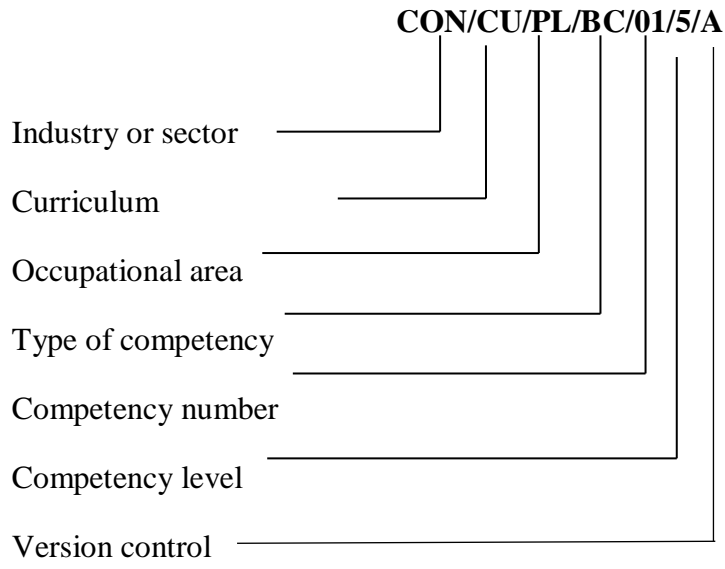
**COUNCIL SECRETARY/CEO
TVET CDACC**

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BC	Basic Competency
CDACC	Curriculum Development, Assessment and Certification Council
CM	Common
CR	Core Units
2D	Two Dimensional
HIV	Human Immuno-Deficiency Virus
PL	Plumbing
CON	Construction
ICT	Information Communication Technology
NEMA	National Environmental Management Authority
OSHA	Occupation Safety and Health Act
OSHS	Occupation Safety and Health Standards
PESTEL	Political Economic Social Technological Environmental and Legal
PPE	Personal Protective Equipment
SSAC	Sector Skills Advisory Committee
SWOT	Strengths Weaknesses Opportunities and Threats
TVET	Technical and Vocational Education and Training

KEY TO UNIT CODE



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COURSE OVERVIEW

Plumbing Level 5 qualification consists of competencies that an individual must achieve to enable him/her offer plumbing services comprising of installing water pipes and systems in buildings, rainwater harvesting Goods and disposal sanitary appliances, drainage systems, sanitary appliances, storage systems and auxiliary fittings, gas supply and installing fire supply control system. It also entails maintaining plumbing systems

Units of Learning

This course consists of basic, common and core units of learning as indicated below:

Basic Units of Learning

Unit of Learning Code	Unit of Learning Title	Duration in Hours	Credit Factor
CON/CU/PL/BC/01/5/A	Communication skills	25	2.5
CON/CU/PL/BC/02/5/A	Digital literacy	45	4.5
CON/CU/PL/BC/03/5/A	Entrepreneurial skills	70	7.0
CON/CU/PL/BC/04/5/A	Employability skills	50	5.0
CON/CU/PL/BC/05/5/A	Environmental literacy	25	2.5
CON/CU/PL/BC/06/5/A	Occupational safety and health practices	25	2.5
Total		280	28.0

Common Units of Learning

Unit of Learning Code	Unit of Learning Title	Duration in Hours	Credit factor
CON/CU/PL/CC/01/5/A	Basic Mathematics	50	5.0
CON/CU/PL/CC/02/5/A	Technical drawing	50	5.0
CON/CU/PL/CC/02/5/A	Scientific principles	40	4.0
Total		140	14

Core Units of Learning

Unit of Learning Code	Unit of Learning Title	Duration in Hours	Credit Factor
CON/CU/PL/CR/01/5/A	Water Supply Systems Installation	100	10
CON/CU/PL/CR/02/5/A	Rainwater harvest and disposal Installation	180	18
CON/CU/PL/CR/03/5/A	Drainage systems Installation	150	15
CON/CU/PL/CR/04/5/A	Sanitary appliances Installation	100	10
CON/CU/PL/CR/05/5/A	Water Storage systems Installation	110	11
CON/CU/PL/CR/06/5/A	Maintenance of plumbing systems	90	9
CON/CU/PL/CR/07/5/A	Fire control system Installation	80	8
	Industrial Attachment	360	36
Total		1170	117
Grand Total		1590	159

Entry Requirements

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

- a) Kenya Certificate of Secondary Education (KCSE) D (Plain)

Or

- b) Certificate in plumbing level 4

Or

- c) Any equivalent qualifications as determined by Kenya National Qualifications Authority (KNQA)

And/or

- d) As may be guided by relevant regulatory body

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 undergo a field attachment for a period of 360hrs in a Construction sector establishment

Assessment

The course will be assessed at two levels:

- a) **Internal assessment:** Conducted by the trainer (internal assessor) who is monitored by an accredited internal verifier.
- b) **External assessment:** Conducted by an accredited external assessor who is monitored by an accredited external verifier

The assessors and verifiers are registered by TVET CDACC which also coordinates external assessment.

Certification

A candidate will be issued with a Certificate of Competency for each unit of competency. To attain the qualification National Certificate Level 5 in Plumbing, 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.

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BASIC UNITS OF LEARNING

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COMMUNICATION SKILLS

UNIT CODE: CON/CU/PL/BC/01/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Communication Skills

Duration of Unit: 25 hours

Unit Description

This unit covers the competencies required to demonstrate communication skills. It involves meeting communication needs of clients and colleagues, contributing to the development of communication strategies, conducting workplace interviews, facilitating group discussions and representing the organisation.

Summary of Learning Outcomes

1. Meet communication needs of clients and colleagues
2. Contribute to the development of communication strategies
3. Conduct interviews
4. Facilitate group discussions
5. Represent the organization

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Meet communication needs of clients and colleagues	<ul style="list-style-type: none">• Communication process• Modes of communication• Medium of communication• Effective communication• Barriers to communication• Flow of communication• Sources of information• Organizational policies• Organization requirements for written and electronic communication methods• Report writing• Effective questioning techniques (clarifying and probing)• Workplace etiquette	<ul style="list-style-type: none">• Interview• Third party reports• Written texts

	<ul style="list-style-type: none"> • Ethical work practices in handling communication • Active listening • Feedback • Interpretation • Flexibility in communication 	
2. Contribute to the development of communication strategies	<ul style="list-style-type: none"> • Dynamics of groups • Styles of group leadership • Openness and flexibility in communication • Communication skills relevant to client groups 	<ul style="list-style-type: none"> • Written • Observation
3. Conduct interviews	<ul style="list-style-type: none"> • Types of interview • Establishing rapport • Facilitating resolution of issues • Developing action plans 	<ul style="list-style-type: none"> • Written • Observation
4. Facilitate group discussions	<ul style="list-style-type: none"> • Identification of communication needs • Dynamics of groups • Styles of group leadership • Presentation of information • Encouraging group members participation • Evaluating group communication strategies 	<ul style="list-style-type: none"> • Written • Observation
5. Represent the organization	<ul style="list-style-type: none"> • Presentation techniques • Development of a presentation • Multi-media utilization in presentation • Communication skills relevant to client groups 	<ul style="list-style-type: none"> • Observation • Written

Suggested Methods of Instructions

- Role playing
- Viewing of related videos

Recommended Resources

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

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DIGITAL LITERACY

UNIT CODE: CON/CU/PL/BC/02/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Digital Literacy

Duration of Unit: 45 hours

Unit Description

This unit covers the competencies required to demonstrate digital literacy. It involves identifying appropriate computer software and hardware, applying security measures to data, hardware, software in automated environment, applying computer software in solving tasks, applying internet and email in communication at workplace, applying desktop publishing in official assignment 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	<ul style="list-style-type: none">• Concepts of ICT• Functions of ICT• History of computers• Components of a computer• Classification of computers	<ul style="list-style-type: none">• Written tests• Oral presentation• Observation
2. Apply security measures to data, hardware and software	<ul style="list-style-type: none">• Data security and control• Security threats and control measures• Types of computer crimes• Detection and protection against computer crimes• Laws governing protection of ICT	<ul style="list-style-type: none">• Written tests• Oral presentation• Observation• Project

3. Apply computer software in solving tasks	<ul style="list-style-type: none"> • Operating system • Word processing • Spread sheets • Data base design and manipulation • Data manipulation, storage and retrieval 	<ul style="list-style-type: none"> • Oral questioning • Observation • Project
4. Apply internet and email in communication at workplace	<ul style="list-style-type: none"> • Computer networks • Network configurations • Uses of internet • Electronic mail (e-mail) concept 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report
5. Apply desktop publishing in official assignments	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report • Project
6. Prepare presentation packages	<ul style="list-style-type: none"> • Types of presentation packages • Procedure of creating slides • Formatting slides • Presentation of slides • Procedure for editing objects 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report • Project

Suggested Methods of Instructions

- Demonstration
- Viewing of related videos
- Discussions
- Assignments
- Direct instructions

Recommended Resources

- Computers
- Other digital devices
- Printers
- Storage devices
- Internet access
- Computer software

ENTREPRENEURIAL SKILLS

UNIT CODE: CON/CU/PL/BC/03/5/A

Relationship to occupational standards

This unit addresses the Unit of Competency: Demonstrate Entrepreneurial Skills

Duration of unit: 70 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 an entrepreneur
2. Demonstrate knowledge of entrepreneurship and self-employment
3. Identify entrepreneurship opportunities
4. Create entrepreneurial awareness
5. Apply entrepreneurial motivation
6. Develop innovative business strategies
7. Develop Business plan

Learning Outcome	Content	Suggested Assessment Methods
1. Demonstrate knowledge of entrepreneurship and self-employment	<ul style="list-style-type: none">• Importance of self-employment• Requirements for entry into self-employment• Role of an Entrepreneur in business• Contributions of	<ul style="list-style-type: none">• Individual/group assignments• Projects• Written tests• Oral questions• Third party

<p>2. Identify entrepreneurship opportunities</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
<p>3. Create entrepreneurial awareness</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
<p>4. Apply entrepreneurial motivation</p>	<ul style="list-style-type: none"> • Internal and external motivation • Motivational theories • Self-assessment • Entrepreneurial orientation • Effective communications in entrepreneurship • Principles of communication • Entrepreneurial motivation 	<ul style="list-style-type: none"> • Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews

5. Develop business innovative strategies	<ul style="list-style-type: none"> • Innovation in business • Small business Strategic Plan • Creativity in business development • Linkages with other entrepreneurs • ICT in business growth and development 	<ul style="list-style-type: none"> • Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews
6. Develop Business Plan	<ul style="list-style-type: none"> • Business description • Marketing plan • Organizational/Management plan • Production/operation plan • Financial plan • Executive summary • Presentation of Business Plan 	<ul style="list-style-type: none"> • Case studies • Individual/group assignments • Projects • Written tests • Oral questions • Third party report • Interviews

Suggested Methods of instructions:

- 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/PL/BC/04/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Employability Skills

Duration of Unit: 50 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 workplace ethics.

Summary of Learning Outcomes

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

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Conduct self-management	<ul style="list-style-type: none">• Self-awareness• Formulating personal vision, mission and goals• Strategies for overcoming life challenges• Emotional intelligence• Assertiveness versus aggressiveness• Expressing personal thoughts, feelings and beliefs• Developing and maintaining high self-esteem• Developing and maintaining positive self-image	<ul style="list-style-type: none">• Written tests• Oral questioning• Interviewing• Portfolio of evidence• Third party report

	<ul style="list-style-type: none"> • Articulating ideas and aspirations • Accountability and responsibility • Good work habits • Self-awareness • Self-development • Financial literacy • Healthy lifestyle practices 	
2. Demonstrate interpersonal communication	<ul style="list-style-type: none"> • Meaning of interpersonal communication • Listening skills • Types of audience • Writing skills • Reading skills • Meaning of empathy • Understanding customers' needs • Establishing communication networks • Sharing information 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
3. Demonstrate critical safe work habits	<ul style="list-style-type: none"> • Stress and stress management • Punctuality and time consciousness • Leisure • Integrating personal objectives into organizational objectives • Resources utilization • Setting work priorities • HIV and AIDS • Drug and substance abuse • Handling emerging issues 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
4. Lead a small team	<ul style="list-style-type: none"> • Leadership qualities • Team building • Determination of team roles and objectives • Team performance indicators • Responsibilities in a team • Forms of communication • Complementing team activities • Gender and gender mainstreaming • Human rights • Maintaining relationships • Conflicts and conflict resolution 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

<p>5. Plan and organize work</p>	<ul style="list-style-type: none"> • Functions of management <ul style="list-style-type: none"> ✓ Planning ✓ Organizing • Time management • Decision making process • Task allocation • Evaluating work activities • Resource utilization • Problem solving • Collecting and organising information 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
<p>6. Maintain professional growth and development</p>	<ul style="list-style-type: none"> • Opportunities for professional growth • Assessing training needs • Licenses and certifications for professional growth and development • Pursuing personal and organizational goals • Identifying work priorities • Recognizing career advancement 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
<p>7. Demonstrate workplace learning</p>	<ul style="list-style-type: none"> • Managing own learning • Contributing to the learning community at the workplace • Cultural aspects of work • Variety of learning context • Application of learning • Safe use of technology • Identifying opportunities • Generating new ideas • Workplace innovation • Performance improvement • Handling emerging issues • Future trends and concerns in learning 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
<p>8. Demonstrate problem solving skills</p>	<ul style="list-style-type: none"> • Problem identification • Problem solving • Application of problem-solving strategies • Resolving customer concerns 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report

<p>9. Demonstrate workplace ethics</p>	<ul style="list-style-type: none"> • Meaning of ethics • Ethical perspectives • Principles of ethics • Values and beliefs • 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 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Interviewing • Portfolio of evidence • Third party report
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Suggested Methods of Instructions

- Demonstrations
- Simulation/Role play
- Discussion
- Presentations
- Case studies
- Q&A

Recommended Resources

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

ENVIRONMENTAL LITERACY

UNIT CODE: CON/CU/PL/BC/05/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate Environmental Literacy

Duration of Unit: 25 hours

Unit Description

This unit describes the competencies required to demonstrate understanding of environmental literacy. It involves controlling environmental hazard, controlling control 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 and monitoring activities on environmental protection/programs.

Summary of Learning Outcomes

1. Control environmental hazards
2. Control environmental Pollution
3. Demonstrate sustainable use of resource
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

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Control environmental hazards	<ul style="list-style-type: none">• Purposes and content of Environmental Management and Coordination Act 1999• Purposes and content of Solid Waste Act• Storage methods for environmentally hazardous materials• Disposal methods of hazardous wastes• Types and uses of PPE in line with environmental regulations• Occupational Safety and Health Standards (OSHS)	<ul style="list-style-type: none">• Written test• Oral questions• Observation

<p>2. Control environmental Pollution control</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Written test • Oral questions • Observation
<p>3. Demonstrate sustainable resource use</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Written test • Oral questions • Observation
<p>4. Evaluate current practices in relation to resource usage</p>	<ul style="list-style-type: none"> • 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 • Identification of areas for improvement 	<ul style="list-style-type: none"> • Written test • Oral questions • Observation
<p>5. Identify Environmental legislations/conventions for environmental concerns</p>	<ul style="list-style-type: none"> • Environmental issues/concerns • Environmental legislations /conventions and local ordinances • Industrial standard /environmental practices • International Environmental Protocols (Montreal, Kyoto) • Features of an environmental strategy 	<ul style="list-style-type: none"> • Written questions • Oral questions • Observation
<p>6. Implement specific environmental programs</p>	<ul style="list-style-type: none"> • Community needs and expectations • Resource availability • 5 s of good housekeeping • Identification of programs/Activities • Setting of individual roles /responsibilities 	<ul style="list-style-type: none"> • Written questions • Oral questions • Observation

	<ul style="list-style-type: none"> • Resolving problems /constraints encountered • Consultation with stakeholders 	
7. Monitor activities on Environmental protection/Programs	<ul style="list-style-type: none"> • Periodic monitoring and Evaluation of activities • Gathering feedback from stakeholders • Analysing 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 	<ul style="list-style-type: none"> • Oral questions • Written tests • Practical test • Observation

Suggested Methods of Instructions

- Instructor led facilitation of theory
- Demonstration by trainer
- Viewing of related videos
- Project
- Assignments
- Role play

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
- Ccompany environmental management systems (EMS)
- Montreal Protocol
- Kyoto Protocol

OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: CON/CU/PL/BC/06/5/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Demonstrate occupational safety and health practices

Duration of Unit: 25 hours

Unit Description

This unit specifies the competencies required to identify workplace hazards and risk, identify and implement appropriate control measures and implement 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	<ul style="list-style-type: none">• 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 is conducted by• Authorized personnel or agency• Gathering of OHS issues and/or concerns raised	<ul style="list-style-type: none">• Oral questions• Written tests• Portfolio of evidence• Third party report
2. Control OSH hazards	<ul style="list-style-type: none">• Prevention and control measures, including use of PPE (personal protective equipment) for specific hazards are identified and implemented• Appropriate risk controls based on result of OSH	<ul style="list-style-type: none">• Oral questions• Written tests• Portfolio of evidence• Third party report

	<p>hazard evaluation is recommended</p> <ul style="list-style-type: none"> Contingency measures, including emergency procedures during workplace incidents and emergencies are recognized and established in accordance with organization procedures 	
3. Implement OSH programs	<ul style="list-style-type: none"> Providing information to work team about company OHS program, procedures and policies/guidelines Participating in implementation of OSH procedures and policies/guidelines Training of team members and advice on OSH standards and procedures Implementation of procedures for maintaining OSH-related records 	<ul style="list-style-type: none"> Oral questions Written tests Portfolio of evidence Third party report

Suggested Methods of Instructions

- Assignments
- 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

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BASIC MATHEMATICS

UNIT CODE: CON/CU/PL/CC/01/5/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Basic mathematics

Duration of Unit: 50 hours

Unit Description

This unit describes the competencies required in applying basic: algebra, trigonometry statistics, indices and logarithms and ratio. It also involves performing geometrical calculations, business calculations, carrying out basic mensuration and plotting simple graphs.

Summary of Learning Outcomes

1. Apply basic algebra
2. Apply basic trigonometry
3. Perform geometrical calculations
4. Carry out basic mensuration
5. Apply basic statistics
6. Plot simple graphs
7. Apply Indices and Logarithms
8. Perform business calculations
9. Apply Ratios

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply basic Algebra	<ul style="list-style-type: none"> • Algebraic expressions • Use of calculator • Simple algebraic operations • Methods of solving quadratic equations • Elimination • Substitution • Solution of equations reduced to quadratic form • Simple quadratic equations • Solutions of simultaneous linear equations of two unknowns 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
2. Apply basic trigonometry	<ul style="list-style-type: none"> • Terms and concepts • Trigonometric rules • Use of tables to find trigonometric ratios • Use of trigonometrical calculations • Lengths of sides • Heights • angles 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
3. Perform geometrical calculations	<ul style="list-style-type: none"> • Perimeter of plane figures • Areas of plane figures • Areas of irregular figures • Application of Pythagoras' theorem • Surface area of prisms and pyramid • Volumes of solids 	<ul style="list-style-type: none"> • Assignments • Oral questioning • Supervised exercises • Written tests

<p>4. Carry out basic mensuration</p>	<ul style="list-style-type: none"> • Common units of measurement of • Length • Mass • Time • Conversion of units • Perimeters, areas and volumes of figures and solids • Sketching of regular figures, solids and nets 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
<p>5. Apply basic statistics</p>	<ul style="list-style-type: none"> • Terms and concepts • Data collection • Data organization • Measures of central tendencies of grouped and ungrouped data • Data presentation • Interpretation of data from given charts 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
<p>6. Plot simple graphs</p>	<ul style="list-style-type: none"> • Types of graphs • linear graphs • bar graphs • pie chart • pictograph • Plotting graphs for given set of data • Interpreting graphs • 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
<p>7. Apply Indices and Logarithms</p>	<ul style="list-style-type: none"> • Conversion of numbers from one base to another • Application of laws of indices in solving exponential equations • Application of law of logarithm in solving logarithmic equations 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises

8. Perform business calculations	<ul style="list-style-type: none"> • Exchange rates • Prices and profit • Calculation of average sales • Calculation of incomes • Calculation of taxes 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
9. Apply Ratios	<ul style="list-style-type: none"> • Difference between rational and irrational numbers • Expression of ratios as percentages • Solving problems involving direct and inverse proportions 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises

Suggested methods of instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

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

TECHNICAL DRAWING

UNIT CODE: CON/CU/PL/CC/02/5/A

Relationship to Occupational Standards

This unit addresses the unit of competency: apply technical drawing

Duration of Unit: 50 hours

Unit Description

This unit covers the competencies required to prepare and apply technical drawing. It involves competencies in selecting, using and maintaining drawing equipment and materials. It also involves developing plane geometry drawings, solid geometry drawings, pictorial and orthographic drawings and apply computer aided design

Summary of Learning Outcomes

1. Select, use and maintain drawing equipment and materials
2. Develop plane geometry drawings
3. Develop solid geometry drawings
4. Develop pictorial and orthographic drawings
5. Apply Computer Aided Design

Learning Outcomes, Content and Suggested Assessment Methods:

Learning Outcome	Content	Suggested Assessment Methods
1. Select, use and maintain drawing equipment and materials	<ul style="list-style-type: none">• Terms and concepts• Drawing equipment• Drawing materials• Use, care and maintenance of drawing equipment's	<ul style="list-style-type: none">• Written tests• Oral questioning• Assignments• Supervised exercises
2. Develop plane geometry drawings	<ul style="list-style-type: none">• Terms and concepts• Types of lines in drawings• Freehand sketching• Construction, measurement and bisection of angles• Construction of geometric forms e.g. squares, circles• Standards drawing conventions	<ul style="list-style-type: none">• Written tests• Oral questioning• Assignments• Supervised exercises

3. Develop solid geometry drawings	<ul style="list-style-type: none"> • Terms and concepts • Interpretation of sketches and drawings of patterns e.g. cylinders, prisms and pyramids • Develop geometrical solid figures e.g. prisms, cones • Surface development • 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
4. Develop orthographic drawings	<ul style="list-style-type: none"> • Terms and concepts • Free hand sketching • Pictorial and orthographic drawings • Meaning of symbols and abbreviations • Drawing and interpretation of orthographic elevations • Dimensioning of orthographic elevations • Conversion of orthographic to pictorial • 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises
5. Apply computer Aided design	<ul style="list-style-type: none"> • Terms and concepts • Geometry drawings • Orthographic drawings 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises

Suggested methods of instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

- Drawing room

- Drawing instruments e.g. T-squares, set squares, drawing sets
- Drawing tables
- Pencils, papers, erasers
- Masking tapes
- Text books
- Samples of solids
- Computer (CAD)

SCIENTIFIC PRINCIPLES

UNIT CODE: CON/CU/PL/CC/03/5/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Scientific principles.

Duration of Unit: 40 Hours

Unit Description

This unit describes the competence in applying scientific principles. It involves applying principles of: units of measurements, force, work, energy and power, friction, heat, acoustics, pressure in fluids, mechanical properties of materials and electrical.

Summary of Learning Outcomes

1. Apply principles of units of measurements
2. Apply principles of Force, work, energy and power
3. Apply principles of Friction
4. Apply principles of heat
5. Apply principles of acoustics
6. Apply principles of pressure in fluids
7. Apply mechanical properties of materials
8. Apply electrical principles

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Apply principles of units of measurements	<ul style="list-style-type: none">• Terms and concepts• Selection of units of measurement• Conversion of units	<ul style="list-style-type: none">• Written tests• Oral questioning• Assignments• Supervised exercises
2. Apply principles of Force, work, energy and power	<ul style="list-style-type: none">• Terms and concepts• Laws<ul style="list-style-type: none">✓ Force✓ Energy• Basic calculations of force, work, energy and power• Application of force, work, energy and power	<ul style="list-style-type: none">• Written tests• Oral questioning• Assignments• Supervised exercises•

3. Apply principles of Friction	<ul style="list-style-type: none"> • Terms and concepts • Types of friction • Laws of friction • Causes of friction • Advantages and disadvantages of friction • Application of friction 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises •
4. Apply principles of heat	<ul style="list-style-type: none"> • Terms and concepts • Sources of heat • Effects of heat on matter • Change of matter as heat varies • Methods of heat transfer • Water heating 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises •
5. Apply principles of pressure in fluids	<ul style="list-style-type: none"> • Terms and concepts • Units of measurements of pressure • Definition of density • Variations of pressure • Laws • Solving simple problems involving liquids of different densities • Application of air pressure in relation to objects in everyday life e.g. Air lock in pipe work 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises •
6. Apply principles of acoustics	<ul style="list-style-type: none"> • Terms and concepts • Sources of sound • Measurement of sound • Effects of sound on surrounding areas • Sound insulation methods 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises •
7. Apply mechanical properties of materials	<ul style="list-style-type: none"> • Terms and concepts • Properties of materials • Tests • Advantages and disadvantages of materials 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises •
8. Apply electrical principles	<ul style="list-style-type: none"> • Terms and Concepts • Electrical principles • Electrical circuits • Electrical safety 	<ul style="list-style-type: none"> • Written tests • Oral questioning • Assignments • Supervised exercises

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Suggested methods of instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Tools and equipment

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

Materials and supplies

- Stationery
- Material samples
- Oils
- Pins
- Electrical cables and accessory

Personal protective equipment (PPEs)

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

CORE UNITS OF LEARNING

easyvet.com

WATER SUPPLY SYSTEMS INSTALLATION

UNIT CODE: CON/CU/PL/CR/01/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Install Water Supply Systems

Duration of Unit: 100 hours

Unit Description

This unit specifies the competencies required to install water supply and systems. It involves preparing working drawings, identifying materials, quantifying and costing, identifying and using pipework tools and equipment, installing pipe works, designing simple pipework and install water distribution system. It applies in the construction industry.

Summary of Learning Outcomes

1. Prepare working drawings
2. Identify materials, quantify and cost
3. Identify and use pipework tools and equipment
4. Install pipe works
5. Design simple pipework
6. Install Water distribution system

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare working drawing	<ul style="list-style-type: none">• Terms and Concepts• Symbols• Scales• Measurements• Reference points	<ul style="list-style-type: none">• Observation• Oral questioning• Third party report• Interviewing• Written tests
2. Identify materials, quantify and cost	<ul style="list-style-type: none">• Terms and concepts• Piping materials and supplies• Pipe sizes• Types of pipes• Types of fittings• Types of valves	<ul style="list-style-type: none">• Observation• Written tests• Oral questioning• Interviewing

	<ul style="list-style-type: none"> • Estimation of quantities 	<ul style="list-style-type: none"> • Third party report
3. Identify and use pipework tools and equipment	<ul style="list-style-type: none"> • Terms and concepts • PPEs and their application • Types of tools and equipment • Care and maintenance • Storage • Use of tools 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
4. Install pipe works	<ul style="list-style-type: none"> • Terms and concepts • Types of Pipes <ul style="list-style-type: none"> ✓ PVC ✓ GI ✓ PPR • Mild steel • Stainless steel • Copper • CPVC • Traps and valves • Piping systems <ul style="list-style-type: none"> ✓ Hot water ✓ Cold water • Pipe jointing and connections • Clenching materials • Adhesives • Pipe fitting • Pipe bending • Functionality tests <ul style="list-style-type: none"> ✓ Air ✓ Water ✓ Pressure ✓ Smoke • Occupational safety and legal framework 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
5. Design simple pipework	<ul style="list-style-type: none"> • Terms and concepts • Materials and supplies • Types of water supply systems <ul style="list-style-type: none"> ✓ Hot water ✓ Cold water 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing

	<ul style="list-style-type: none"> • Occupational safety and legal requirements 	<ul style="list-style-type: none"> • Third party report
6. Install Water distribution system	<ul style="list-style-type: none"> • Terms and concepts • Water supply systems • Setting out • Materials and supplies • Tools and equipment • Installation • Housekeeping • Tests • Faults • Safety and health practice 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report

Suggested methods of instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Functional Workshop with the following:

Tools and Equipment

- Welding machine
- Reamers
- Files
- Pipe and tube cutters
- Pipe inspection equipment
- Pipe extractors
- Mason's hammer
- Chisel
- Trowels (Brick, pointing, window, corner and finishing trowels)
- Spirit level
- Bolster
- Cold chisel
- Hawk (Hand board)
- Sandpaper/Sponge

- Jointing knife/rod
- Stepping ladder
- Mason's line

Supplies and Materials

- Adhesive
- Pipes
- Pipe fittings
- Valves
- Taps
- Water filters
- Water pumps

RAINWATER HARVEST AND DISPOSAL

UNIT CODE: CON/CU/PL/CR/02/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Install rainwater harvesting and disposal

Duration of Unit: 180 hours

Unit Description

This unit specifies the competencies required to harvest and dispose rain water. It involves preparing working drawings, quantifying materials and costing, using tools and equipment, installing rain water goods, testing rainwater goods and harvesting / disposing rainwater. It applies in the construction industry.

Summary of Learning Outcomes

1. Prepare working drawings
2. Quantify materials
3. Use tools and equipment
4. Install rainwater goods
5. Test rainwater goods

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare working drawings	<ul style="list-style-type: none">• Terms and Concepts• Symbols• Scales• Measurements• Drawing techniques• Reference points	<ul style="list-style-type: none">• Observation• Oral questioning• Third party report• Interviewing• Written tests
2. Quantify and cost materials	<ul style="list-style-type: none">• Terms and concepts• Rainwater goods materials and supplies<ul style="list-style-type: none">✓ Plastics✓ Ferrous✓ Non-ferrous• Types of rainwater goods• Types of fittings	<ul style="list-style-type: none">• Observation• Written tests• Oral questioning• Interviewing• Third party report

	<ul style="list-style-type: none"> • Material and supplies schedule • Estimation of quantities • Cost estimation • Tools and equipment 	
3. Use tools and equipment	<ul style="list-style-type: none"> • Terms and concepts • PPEs and their application • Use of rainwater tools and equipment • Safety, care and maintenance of rainwater tools and equipment • Storage of rainwater tools and equipment 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
4. Install rainwater goods	<ul style="list-style-type: none"> • Terms and concepts • Harvesting methods • Disposal methods • Types of rainwater goods • Measurements • Types of materials • Types of joints • Methods of assembling • Housekeeping 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
5. Test rain water goods	<ul style="list-style-type: none"> • Terms and concepts • Testing methods • Types of faults • Housekeeping • Cutting methods • Materials and supplies • Installation of rainwater goods • Quality checks • Occupational safety and legal framework 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party

Suggested methods of instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Functional Workshop with the following:

Tools and Equipment

- Plumb bob
- Measuring tools (Tape measure, infra-red light, rule etc.)
- Marking tools
- Cutting tools
- Fastening tools
- files
- Wire brushes
- Holding tools
- Drilling equipment

Supplies and Materials

- Pipes
- Gutters
- Pipe fittings
- Accessory
- Adhesives
- Sealant

DRAINAGE SYSTEMS INSTALLATION

UNIT CODE: CON/CU/PL/CR/03/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Install Drainage systems

Duration of Unit: 150 hours

Unit Description

This unit specifies the competencies required to install drainage systems. It involves preparing working drawings, quantifying and cost drainage materials, using drainage tools and equipment setting out drainage systems, install above ground drainage system identifying drainage materials and installing below ground drainage system and testing. It applies in the construction industry.

Summary of Learning Outcomes

1. Prepare working drawings
2. Quantify drainage materials
3. Use drainage tools and equipment
4. Setting out drainage systems
5. Install above ground drainage system
6. Install below ground drainage system

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare working drawing	<ul style="list-style-type: none">• Terms and Concepts• Symbols• Scales• Measurements• Reference points• Types of drawings<ul style="list-style-type: none">✓ Details and sections✓ Pictorial✓ Line drawings✓ Freehand sketching✓ Isometric drawings	<ul style="list-style-type: none">• Observation• Oral questioning• Third party report• Interviewing• Written tests

<p>2. Quantify and cost drainage materials</p>	<ul style="list-style-type: none"> • Terms and concepts • Drainage materials and supplies • Material and supplies schedule • Estimation and cost of quantities 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
<p>3. Use drainage tools and equipment</p>	<ul style="list-style-type: none"> • Terms and concepts • PPEs and their application • Use of drainage tools and equipment • Safety, care and maintenance of drainage tools and equipment • Storage of drainage tools and equipment 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
<p>4. Set out drainage systems</p>	<ul style="list-style-type: none"> • Terms and concepts • Levelling • Boning rods • Hose pipe • Dumpy level • Drainage bends 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
<p>5. Install above ground drainage system</p>	<ul style="list-style-type: none"> • Terms and concepts • Installation procedure • Types of pipes • Pipe sizes • Types of fittings • Types of appliances • Types of traps • Types of piping systems • Functionality test. • Soundness test • Fault checks 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report
<p>6. Install below ground drainage system</p>	<ul style="list-style-type: none"> • Terms and concepts • Trench excavation • Pipe sizes and pipe laying • Construction of inspection chambers, manholes and traps • Haunching 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party report

	<ul style="list-style-type: none"> • Types of drainage systems • Private and public sewer • Functionality test. • Soundness test • Fault checks • Occupational safety and legal requirements 	
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Suggested methods of instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Functional Workshop with the following:

Tools and Equipment

- Measuring tools
- Levelling equipment's
- Mason trowels
- Mason square
- Spirit level
- Hose Pipe
- Boning rods
- Floats
- Mallet
- Ball hammer
- Masonry chisel

Supplies and Materials

- Various types and sizes of fittings
- Caulking tools
- Various types of pipe support
- Clay pipes
- UPVC
- Cast iron
- Concrete

SANITARY APPLIANCES INSTALLATION

UNIT CODE: CON/CU/PL/CR/04/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Install sanitary appliances

Duration of Unit: 100 hours

Unit Description

This unit specifies the competencies required to install sanitary appliances. It involves preparing simple working drawings, quantifying and costing sanitary appliances, fixing sanitary appliances and testing and commissioning working of sanitary appliances. It applies in the construction industry

Summary of Learning Outcomes

1. Prepare working drawings
2. Quantify sanitary appliances
3. Fix sanitary appliances
4. Test and commission working of sanitary appliances

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare working drawings	<ul style="list-style-type: none">• Terms and Concepts• Symbols• Scales• Measurements• Reference points• Simple drawings• Manufacturers specifications• Assembling of sanitary appliances	<ul style="list-style-type: none">• Observation• Written tests• Oral questioning• Interviewing• Third party reports
2. Quantify and cost sanitary appliances	<ul style="list-style-type: none">• Terms and concepts• Sanitary appliances and supplies• Types of sanitary appliances• Classify sanitary appliances• Estimation of quantities and cost	<ul style="list-style-type: none">• Observation• Written tests• Oral questioning• Interviewing• Third party reports

3. Fix sanitary appliances	<ul style="list-style-type: none"> • Terms and concepts • PPEs • Positioning of sanitary appliances • Fixing and fastening • Soundness test • Stands and supports • Housekeeping • Occupational safety and legal requirements 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party reports
4. Test and commission working of sanitary appliances	<ul style="list-style-type: none"> • Functionality test • Faults in sanitary appliances • Commission and hand over 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party reports

Suggested Methods of Instructions:

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Functional Masonry Workshop with the following:

Tools and Equipment

- Spirit level
- Bolster
- Cold chisel
- Jointing knife/rod
- Stepping ladder
- Building line
- Plumb bob
- Measuring tools (Tape measure,
- Power tools
- PPE's
- Straight edge
- Mason's Square
- Pipe wrench

- Pipe bending machine
- Blow lamp
- Reamers
- Files
- Drills and drill bits
- Mason's hammer
- Chisel
- Trowels (Brick, pointing, window, corner and finishing trowels)

Supplies and Materials

- Adhesives
- Sanitary appliances
- Fasteners
- Cement
- Sand
- Pipes
- Fittings
- Caulking material

WATER STORAGE SYSTEMS AND AUXILLIARY FITTINGS INSTALLATION

UNIT CODE: CON/CU/PL/CR/05/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: install water storage systems and auxiliary fittings

Duration of Unit: 110 hours

Unit Description

This unit specifies the competencies required to install water storage systems and auxiliary fittings. It involves preparing working drawings, quantifying and costing materials, installing storage systems and auxiliary fittings, and testing and commissioning auxiliary fittings. It applies in the construction industry.

Summary of Learning Outcomes

1. Prepare water storage drawings
2. Quantify and cost materials
3. Install storage systems and auxiliary fittings
4. Test and commission storage and auxiliary fittings

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare water storage drawings	<ul style="list-style-type: none">• Terms and Concepts• Symbols• Measurements• Storage fittings• Storage capacity	<ul style="list-style-type: none">• Observation• Oral questioning• Interviewing• Third party reports• Written tests
2. Quantify and cost storage materials	<ul style="list-style-type: none">• Terms and concepts• Types of storage• Types of auxiliary fittings• Quantify materials and supplies• estimation of quantities and costs	<ul style="list-style-type: none">• Observation• Written tests• Oral questioning• Interviewing• Third party reports

<p>3. Install storage systems and auxiliary fittings</p>	<ul style="list-style-type: none"> • Terms and concepts • PPEs • Types of storages systems • Size • Shape • Materials • manufacturer • Pumping systems • Boosted • Direct pumping • Indirect pumping • Unboosted • Zoned system • Types of pumps • Installation • Supports • Positioning • Housekeeping • Occupational safety and legal requirements 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party reports
<p>4. Test and commission storage and auxiliary fittings</p>	<ul style="list-style-type: none"> • Tests • Leakages • Heads • Pressure • Faults • Leakages • Sanction and delivery pressure • Water hammer • Air lock 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party reports

Suggested Methods of Instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Functional Plumbing Workshop with the following:

Tools and Equipment

- Pipe wrench
- Pipe cutter
- Hacksaw
- Pipe Threading Equipment
- Vice - Bench
- Pliers
- Tap and Punch
- Files
- Screwdrivers
- Drill with various sizes of bits
- Mallet
- Ball hammer
- PPR machine / Heat Fusion equipment
- Pipe bender
- Sealant gun

Supplies and Materials

- Fittings
- Backnuts
- Cisterns
- Valves
- Sealant
- Water proofing agents

MAINTANANCE OF PLUMBING SYSTEMS INSTALLATION

UNIT CODE: CON/CU/PL/CR/06/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Maintain plumbing systems

Duration of Unit: 90 hours

Unit Description

This unit specifies the competencies required to maintain plumbing systems. It involves detecting faults in plumbing systems, quantifying requirements for repair, fixing plumbing system faults and testing plumbing system. It applies in the construction industry.

Summary of Learning Outcomes

1. Detect plumbing systems faults
2. Quantify requirements for repair
3. Fixing plumbing system faults
4. Test plumbing system

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Detect plumbing systems faults	<ul style="list-style-type: none">• Terms and concepts• Common faults in plumbing works• Causes of faults in plumbing works• Rectifying faults in plumbing works	<ul style="list-style-type: none">• Observation• Written tests• Oral questioning• Interviewing• Third party reports
2. Quantify requirements for repair	<ul style="list-style-type: none">• Terms and concepts• Materials and supplies for repair• Estimation of quantities• Appliance and fittings• Reference to manufacturer's manual	<ul style="list-style-type: none">• Observation• Written tests• Oral questioning• Interviewing• Third party reports

	<ul style="list-style-type: none"> • 	
3. Fix faults in plumbing system	<ul style="list-style-type: none"> • Terms and concepts • Types of maintenance • Maintenance reports & schedules • PPEs and their use • Plumbing tools and equipment • Rectification procedures • Safety, care and maintenance of plumbing tools and equipment • Plumbing parts repair/replacement • Housekeeping • Storage of plumbing tools and equipment 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party reports
4. Test plumbing system	<ul style="list-style-type: none"> • Testing plumbing systems • Types of tests • Reinstating plumbing systems 	<ul style="list-style-type: none"> • Observation • Written tests • Oral questioning • Interviewing • Third party reports

Suggested methods of instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Functional Plumbing Workshop with the following:

Tools and Equipment

- Pipe wrench
- Pipe cutter
- Hacksaw
- Pipe Threading Equipment
- Vices
- Taps
- Punch
- Files
- Screwdrivers
- Drill with various sizes of bits
- Portable drill
- Mallet
- Ball pein0 hammer
- Mason chisel
- PPR machine / Heat Fusion equipment
- Pipe bender
- Trowel
- De-clogging wire / de-clogging machine
- Toilet pump

Supplies and Materials

- Screws
- Adhesives
- Cement
- Sand
- Pipes
- Traps
- Electric cables
- Caulking material
- Fitting

FIRE CONTROL SYSTEMS INSTALLATION

UNIT CODE: CON/CU/PL/CR/07/5/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Install fire control systems

Duration of Unit: 80 hours

Unit Description

This unit specifies the competencies required to install fire control systems. It involves preparing working drawings, selecting tools and equipment for installation, quantify and cost materials and supplies, install sprinkler systems, install hose reel systems, install wet and dry risers and maintain and service fire suppression systems. It applies in the construction industry.

Summary of Learning Outcomes

1. Prepare working drawing
2. Select tools and equipment
3. Quantify materials and supplies
4. Install sprinkler systems
5. Install hose reel systems
6. Install wet and dry risers
7. Maintain and service fire suppression systems

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare working drawing	<ul style="list-style-type: none">• Terms and Concepts• Symbols• Measurements• Types of Scales• Types of drawings	<ul style="list-style-type: none">• Practical Tests• Written tests• Oral questioning• Interviewing• Third party reports
2. Select tools and equipment	<ul style="list-style-type: none">• Terms and concepts• PPEs and their use• Use of fire control installation tools and equipment	<ul style="list-style-type: none">• Practical Tests• Written tests• Oral questioning• Interviewing• Third party reports

	<ul style="list-style-type: none"> • Safety, care and maintenance of fire control installation tools and equipment • Storage of fire control installation tools and equipment 	
3. Quantify materials and supplies	<ul style="list-style-type: none"> • Terms and concepts • Fire control installation materials and supplies • Fire control fittings • Fire control installation Material schedule • Estimation and cost of quantities 	<ul style="list-style-type: none"> • Practical Tests • Written tests • Oral questioning • Interviewing • Third party reports
4. Install Sprinkler systems	<ul style="list-style-type: none"> • Terms and concepts • Classification of fire • Types of Sprinklers systems <ul style="list-style-type: none"> ✓ Pre-Action Systems ✓ Dry Pipe Systems ✓ Wet Pipe Systems • Automatic fire detectors • Types of Pipes <ul style="list-style-type: none"> ✓ GI ✓ PVC ✓ PPR ✓ CPVC • Types of Joints and connections • Setting out • Bending • Fitting • Types of testing <ul style="list-style-type: none"> ✓ Air ✓ Smoke ✓ Pressure • Faults • valves • Adhesives • Fittings • Occupational safety and legal framework 	<ul style="list-style-type: none"> • Practical Tests • Written tests • Oral questioning • Interviewing • Third party reports

<p>5. Install hose reel systems</p>	<ul style="list-style-type: none"> • Terms and concepts <ul style="list-style-type: none"> ✓ Types of fire hose reel systems Stationary Hose Reels ✓ Mobile or Portable Hose Reels ✓ Hose Reel Carts ✓ Hideaway Hose Reels ✓ Air Hose Reels • Installation of hose reel systems • Tests • faults • House keeping • valves 	<ul style="list-style-type: none"> • Practical Tests • Written tests • Oral questioning • Interviewing • Third party reports
<p>6. Install fire risers systems</p>	<ul style="list-style-type: none"> • Terms and concepts • Types of riser's systems • Installation of fire <ul style="list-style-type: none"> ✓ Dry Pipe Systems ✓ Wet Pipe Systems • Tests • faults • House keeping • valves 	<ul style="list-style-type: none"> • Practical Tests • Written tests • Oral questioning • Interviewing • Third party reports
<p>7. Maintain and service fire suppression systems</p>	<ul style="list-style-type: none"> • Terms and concepts • Types of maintenance • Servicing and cleaning gas supply systems • Checks • Fire drills 	<ul style="list-style-type: none"> • Practical Tests • Written tests • Oral questioning • Interviewing • Third party reports

Suggested Methods of Instructions

- Discussions
- Demonstration
- visiting Lecturer/Expert
- Industrial Visits

Recommended Resources

Functional Plumbing Workshop with the following:

Tools and Equipment

- Pipe wrench
- Pipe cutter
- Hacksaw
- Pipe Threading Equipment
- Vices
- Taps
- Punch
- Files
- Screwdrivers
- Drill with various sizes of bits
- Portable drill
- Mallet
- Ball peen hammer
- Mason chisel
- PPR machine / Heat Fusion equipment
- Pipe bender
- Trowel
- De-clogging wire / de-clogging machine

Supplies and Materials

- Screws
- Adhesives
- Cement
- Sand
- Pipes
- Traps
- Electric cables
- Caulking material
- Fitting

