

31.3.0 ESTIMATING, TENDERING AND ENGINEERING SERVICES CONTRACTS

31.3.01 Introduction

This module unit is designed to equip the trainee with knowledge, skills and attitudes necessary to understand the concept of contracting, estimating and tendering for a project, administration and execution of contract works. Knowledge of electrical installation and electrical installation design is a prerequisite to this module unit.

31.3.02 General Objectives

At the end the module unit, the trainee should be able to:

- a) Discuss the legal requirements for contracts and their effects.
- b) Outline the estimating and tendering process.
- c) Understand principles of contracting.
- d) Appreciate the need for having a structured administration of contract works
- e) Apply standards and rules applicable to specific contracts.
- f) Manage a construction site

31.3.03 Module Unit Summary and Time Allocation

Estimating, Tendering and Engineering Services Contract

Code	Sub Module Unit	Content	Time Hrs
31.3.1	Law	<ul style="list-style-type: none">• Sources of law• Law of contract• Law of tort	10
31.3.2	Contracts	<ul style="list-style-type: none">• Types of contracts• Contracts documents• Clauses in the documents• Important clauses in contract documents	12
31.3.3	Estimating	<ul style="list-style-type: none">• Methods of measurement for electrical works• Extraction of information from documents• Labour elements in an estimate• Overhead costs elements	8

31.3.4	Tendering	<ul style="list-style-type: none"> • The tendering process • Types of tenders 	10
31.3.5	Supplies of Materials	<ul style="list-style-type: none"> • Materials, scheduling and programmes • Cash and trade discounts 	8
31.3.6	Works Planning and Control	<ul style="list-style-type: none"> • Bar charts • CPA networks 	8
31.3.7	Site control and Administration	<ul style="list-style-type: none"> • Work measurement procedures • Site meetings preparations • Conducting site meetings • Site meeting documentation and document storage 	10
Total Time			66

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31.3.1 LAW

Theory

31.3.1T0 *Specific Objectives*

By the end of the sub-module unit, the trainee should able to:

- a) explain sources of law
- b) explain law of contracts
- c) explain law of tort

Content

31.3.1T1 Sources of law

- i) Common law
- ii) Custom
- iii) Judicial precedent
- iv) Legislation
- v) Equity

31.3.1T2 Law of contracts

- i) Formation of contract
- ii) Nature and essentials of a valid contract
- iii) Capacities of the parties to enter into a contract.
- iv) Interpretation and proof of contracts
- v) Discharge of contracts the remedies for breach of contract
- vi) Sales of goods act, as applicable to contract work
- vii) Position between emptor and vendor
- viii) Need for:
- ix) Construction of contract
- x) Content of contract
- xi) Issue and respect of instructions

xii) Contracts of guarantee and indemnity

xiii) Insurance

xiv) Obligations of:

- Main contractor
- Sub-contractor
- The procedure of settlement of disputes- Mutual agreement
- arbitration
- High Court proceedings.

xv) Bankruptcy

- Building Owner,
- Main Contractor
- Sub-Contractors
- Suppliers

31.3.1T3 The law of tort

- Nature
- Nuisance
- Trespass
- Negligence
- Vicarious liability and liability for sub-contracts

31.3.1C Competence

The trainee should have the ability to: apply various types of laws in life in electrical contracts jobs

Suggested teaching/Learning Activities

- Discussion
- Demonstration
- Note taking

Suggested teaching/Learning Resources

- The law of Kenya

Suggested Evaluation Methods

- Oral tests
- Timed written tests
- Assignments

31.3.2 CONTRACTS

Theory

- 31.3.2T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should able to:
- explain types of contracts
 - describe various contract documents
 - explain contract clauses
 - explain important clauses in the contract documents

Content

- 31.3.2T1 Types of contract
- Lump sum
 - BOQ
 - Package deal
 - Cost reimbursement
- 31.3.2T3 Contract documents
- Agreement and schedule of conditions of building contract sanctioned by Relevant recognized professional bodies.
 - Agreement and schedule of conditions of building (without quantities) sanctioned by relevant recognized professional bodies.
 - Agreement and schedule of conditions of building sub-contract sanctioned by

Relevant Recognized professional body.

- 31.3.2T4 Important Contract clauses
- Obligation inherent in the contract
 - Commencement of work
 - Extension of time
 - Disturbance of progress
 - Variations
 - Claims
 - Certificates
 - Final certificates
 - completion

31.3.2C Competence

The trainee should have the ability to: engage into electrical contractual jobs

Suggested teaching/Learning Activities

- Discussion
- Demonstration
- Note taking

Suggested teaching/Learning Resources

- The law of Kenya
- Sample contractual documents

Suggested Evaluation Methods

- Oral tests
- Timed written tests
- Assignments

31.3.3 ESTIMATING

Theory

31.3.3T0 *Specific Objectives*

By the end of the sub - module unit, the trainee should be able to:

- a) describe the methods of measurement and estimating for electrical engineering work
- b) explain methods of extracting quantities from enquiry documents
- c) explain the significance of labour and material elements in the build-up of an estimate
- d) describe the methods of assessing all support resources in order to calculate overhead costs
- e) describe other methods of responding to enquiries and meeting respective instructions

Content

31.3.3T1 Methods of measurement and estimation for electrical engineering

- i) Need for careful examinations of drawings, specifications, bills of quantities and forms of contract
- ii) The liabilities of accepting onerous conditions in sub-

contracts for labour, materials and payment.

- iii) Typical examples of onerous clauses in contract documents and why the clauses are onerous
- iv) Inclusion of the condition contained in the main contract.
- v) Fluctuating and non-fluctuating estimates
- vi) Prime cost (PC) and provisional sums (PS).

31.3.3T2 Methods of extracting quantities from enquiry documents

- i) Processes of taking off quantities of materials and labour abstracting and billing, using drawings and specifications
- ii) Importance of examining a bill of quantities against relevant design and enquiry documents
- iii) Construction and description of a simple form of estimate
- iv) Comparison of standard forms of estimate sheet in commercial use

31.3.3T3 Significance of labour and material elements in the build-up of an estimate

- i) Factors affecting the allocation of labour
- ii) Methods of calculating labour input to carry out work in a specified time

	<ul style="list-style-type: none"> iii) Methods of allocating labour to an estimate iv) Possible constraints in labour allocation v) Methods of calculating an average labour team, for estimating purposes, and limitation of this method vi) Calculate day work rates from given data vii) Methods and condition of material purchases viii) Examples of typical application of discounts ix) Methods of dealing with preliminaries 	<ul style="list-style-type: none"> i) Take off electrical materials from electrical design drawings ii) Estimate the cost of an electrical installation
		<p><i>Suggested teaching/Learning Activities</i></p> <ul style="list-style-type: none"> - Discussion - Demonstration - Note taking
		<p><i>Suggested teaching/Learning Resources</i></p> <ul style="list-style-type: none"> - Take off sheets - Electrical installation designs
		<p><i>Suggested Evaluation Methods</i></p> <ul style="list-style-type: none"> - Oral tests - Timed written tests - Assignments - Practical material take off and preparation of bill of quantities
31.3.3T4	<p>Methods of assessing all support resources in order to calculate overhead costs</p> <ul style="list-style-type: none"> i) List and explain office overheads ii) List and explain site overheads iii) assessment of overheads iv) Allocation of overheads to the estimate 	
31.3.3T5	<p>Description of other methods of responding to enquiries and meeting respective instructions;</p> <ul style="list-style-type: none"> i) Simple estimate and order ii) Cost plus iii) Day-work iv) Damage 	
31.3.3C	<p>Competence The trainee should have the ability to:</p>	
		<p>31.3.4T0 TENDERING</p> <p>Theory</p> <p>31.3.4T0 <i>Specific Objectives</i> By the end of the sub-module unit the trainee should able to:</p> <ul style="list-style-type: none"> a) explain tendering process. b) explain types of tendering
		<p><i>Content</i></p> <p>31.3.4T1 Tendering process</p> <ul style="list-style-type: none"> i) Invitation to tender ii) Compilation of tender documents iii) Acceptance of tenders

- iv) Compilation of approved tender
 - v) Tender box
 - vi) Advantages
 - vii) Disadvantages
- 31.3.4T2 Types of tendering open
- i) Competitive
 - ii) Selective
 - iii) Negotiated contracts
 - iv) Package deals

- 31.3.4C **Competence**
The trainee should have the ability to:
- i) Interpret tender documents
 - ii) Tender for a job

Suggested teaching/Learning Activities

- Discussion
- Demonstration
- Note taking

Suggested teaching/Learning Resources

- Sample bill of quantities
- Sample tender documents
- Electrical installation designs

Suggested Evaluation Methods

- Oral tests
- Timed written tests
- Assignments
- Practical tendering work

31.3.5 **SUPPLIES OF MATERIALS**

Theory

- 31.3.5T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should able to:

- a) explain the procedure for material schedules and programmes ordering and associated documentation
- b) explain cash and trade discounts

Content

- 31.3.5T1 Procedure for preparation of material schedules and programmes for ordering
- i) Procedure for preparation of material schedules
 - ii) Supply procedure
 - iii) Quotations
 - iv) Purchase orders
 - v) Delivery notes
 - vi) Invoices
 - vii) Debit and credit notes
 - viii) Statements of account
 - ix) Specifications
 - x) Bill of quantities and schedule of rates
 - xi) Responsibility for
 - xii) Breakages
 - xiii) Defects

- 31.3.5T2 Cash and trade discounts

- 31.3.5C **Competence**
The trainee should have the ability to: order materials using the right procedure

Suggested teaching/Learning Activities

- Discussion
- Demonstration
- Note taking

Suggested teaching/Learning Resources

- Sample materials supply documents

Suggested Evaluation Methods

- Oral tests
- Timed written tests
- Assignments

31.3.6T0 WORKS PLANNING & CONTROL

Theory

31.3.6T0 *Specific Objectives*
By the end of the sub-module unit the trainee should able to prepare a programme of works

Content

31.3.6T1 Programme of works
i) Bar charts
ii) CPA networks

31.3.7 SITE CONTROL AND ADMINISTRATION

Theory

31.3.7T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should able to:
a) explain the procedures for site measurement
b) explain the procedures for site meetings preparation
c) conduct site meeting
d) appropriately document and store site documents

Content

31.3.7T1 procedures for site measurement

- i) Explain procedure for maintaining records of variation
- ii) Explain procedure for preparation of day work sheets
- iii) Describe procedure for measuring work on site including assessment of percentage completion
- iv) Explain the use of site measurement in the above for determination of valuations and variations

31.3.7T2 Procedures for site meetings

- i) The convener of site meetings
- ii) Notification
- iii) The parties that should attend site meetings

31.3.7T3 Meeting procedures

31.3.7T4 sit meeting documentation

31.3.7C Competence

The trainee should have the ability to: .manage a site

Suggested teaching/Learning Activities

- Discussion
- Demonstration
- Note taking
- Field visits
- Role play on site meeting

Suggested teaching/Learning Resources

- Construction sites
- Sample site meetings minutes
- Work measurement sample sheets and records

Suggested Evaluation Methods

- Oral tests
- Timed written tests
- Assignments
- Practical tendering work

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