# SURVEYING III

## 34.3.0 Introduction

34.3.1 This module unit involves the study of the processes of establishing points on part of the earth's surface in relation to other points of known altitude and bearing. It is intended to equip the trainee with knowledge, skills and attitudes necessary in computing heights of points and their bearings which is necessary in construction works.

## 34.3.2 General Objectives

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

a) understand working principles of survey instruments
b) carry out survey work to provide data for planning, design and construction of works
c) apply surveying skills to control construction works
d) appreciate modern technologies in surveying field

## 34.3.3 Module Unit Summary and Time Allocation – (77 Hours)

| Code | Sub Module Units | Content | Total Hours |
|---|---|---|---|
| 34.3.01 | Tacheometry | • Principles of Tacheometry<br>• Tools and Equipment<br>• Procedure<br>• Booking and Reduction | 30 |
| 34.3.02 | Earthworks | • Areas and Volumes<br>• Mass Haul Diagrams<br>• Terms<br>• Tools and Equipment<br>• Irregular Areas and Volumes<br>• Mass Haul Diagrams | 22 |
| 34.3.03 | Setting out Works | • Tools and Equipment<br>• Setting Out Procedure | 16 |
| 34.3.04 | Mapping and Photographs | • Introduction<br>• Types of Maps and Photographs<br>• Properties<br>• Photo Planes<br>• Scales | 20 |

| | | | |
|---|---|---|---|
| | | • Use of Stereoscope | |
| **Total** | | | 88 |

## TACHEOMETRY

34.3.01

Theory

34.3.01T0 *Specific Objectives*

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

a) explain principles of tacheometry
b) describe the tools and equipment used in tacheometry
c) outline the procedure of carrying out tachometry

34.3.01C *Competence*

The trainee should have the ability to:

i) select tacheometry tools and equipments
ii) carry out tacheometry survey
iii) determine heights and distances from tachemetry data

*Content*

34.3.01T1 Principles of tacheometry
34.3.01T2 Tools and equipment
34.3.01T3 Tacheometry procedure

Practice

34.3.01P0 *Specific Objectives*

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

a) select tools and equipment used in tacheometry
b) carry out a tacheometric survey
c) book readings
d) analyse data from tacheometry

*Content*

34.3.01P1 Tools and equipment
34.3.01P2 Tacheometry survey
34.3.01P3 Readings
34.3.01P4 Data analysis
- Heights
- Distances



## 34.3.02 EARTHWORKS AND MASS HAUL

Theory

34.3.02T0 *Specific Objectives*

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

a) define terms used in earthworks and mass haul diagrams
b) describe tools and equipments for determining irregular areas
c) explain methods of determining irregular areas and volumes
d) outline the uses of mass haul diagrams

34.3.02C *Competence*

The trainee should have the ability to:

i) determine areas and volumes of irregular objects
ii) draw and use mass haul diagrams

*Content*

34.3.02T1 Terminologies
34.3.02T2 Select tools and equipments
34.3.02T3 Determine methods of irregular area and volumes
34.3.02T4 Uses of MHD

Practice

34.3.02P0 *Specific Objectives*

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

a) select tools and equipment for determining irregular areas
b) compute areas and volumes of irregular objects
c) draw mass haul diagrams
d) use mass haul diagrams to plan and execute earthworks operations

*Content*

34.3.02P1 Tool and equipments
34.3.02P2 Determination of areas and volumes
34.3.02P3 Plotting of mass haul diagrams
34.3.02P4 Use of mass haul diagram

34.3.03 **SETTING OUT WORKS**

Theory

34.3.03T0 *Specific Objectives*

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

a) describe setting out tools and equipment
b) explain procedure of setting out a building
c) describe tools for ensuring vertically of buildings

34.3.03C *Competence*

The trainee should have the ability to:

i) select tools
ii) set out a building
iii) check vertically of multistory building

*Content*

34.3.03T1 Tools and equipment
34.3.03T2 Procedure of setting out
34.3.03T1 Tools and equipments for vertical alignment
- Plumb bob
- Theodolite

Practice

34.3.03P0 *Specific Objectives*

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

a) select tools and equipment for setting out a building
b) set out a building
c) ensure vertically of a multistorey building

*Content*

34.3.03P1 Tools and equipment
34.3.03P2 Setting out
34.3.03P3 Vertical alignment

## 34.3.04 MAPPING AND PHOTOGRAPHS

### Theory

34.3.04T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) explain properties of maps and photographs
b) outline types of maps and photographs
c) explain photo planes and their relationships
d) explain interrelationship between scales
e) explain the working principle of a stereoscope

34.3.04C *Competence*
The trainee should have the ability to:
i) handle a stereoscope
ii) determine heights from aerial photographs

*Content*

34.3.04T1 Properties of :
- maps
- photographs

34.3.04T2 Types
- maps
- topographical
- climatical
- photographs
- aerial
- terrestrial

34.3.04T3 Photo planes
- negative
- positive
- mathematical relationships

34.3.04T4 Scales
interrelationship
- photo scales
- map scales
- ground scales

34.3.04T5 Sterescope
- working principle
- pairs of air photographs

Practice

34.3.04P0 *Specific Objectives*
At the end of the sub-module unit, the trainee should be able to:
a) manipulate a stereoscope
b) manipulate and view a pair of photographs

*Content*

34.3.04P1 Manipulations of stereoscope

34.3.04P2 View photographs

*Suggested Teaching/Learning Methods*
- Lecture
- Discussion

- Practicals

*Suggested Teaching/Learning Resources*

- Text books
- Stereoscope or any other new technology machines
- Aerial photographs
- Visits to industries

*Suggested Assessment Methods*

- Oral
- Written tests
- Practical tests
-

Tools and Equipment

- Tacheometer
- Stereoscope
- Scales
- Strings
- Pegs
- Plumb bob