19.2.0 QUANTITATIVE TECHNIQUES

19.2.1 **Introduction**

This module unit is intended to equip the trainee with necessary knowledge, skills and attitudes that will enable him/her apply quantitative techniques in making business decisions

19.2.2 **General Objectives**

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

a) discuss the use of quantitative techniques in business
b) recognise the role of quantitative techniques in decision making
c) describe the use of network analysis in project management
d) cope with the emerging trends and issues in quantitative techniques

19.2.3 **Module Unit Summary and Time Allocation**

Code	Sub-Module Units	Content	Time (Hours)
19.2.01	Introduction to Quantitative Techniques	• Meaning of quantitative techniques • Development of quantitative techniques • Role of quantitative techniques • Types of quantitative techniques • Areas where quantitative techniques are applicable	4
19.2.01	Correlation and Regression	• Definition of terms correlation and regression • Differences and similarities between correlation and regression • Methods of studying correlation • Interpretation of correlation coefficient • Linear regression equation • Forecasting using regression equation	6

Code	Sub-Module Units	Content	Time (Hours)
19.2.03	Linear Programming	• Definition of linear programming • Assumption of linear programming • Requirements of linear programming • Formulation of linear equation • Formulation of linear programming problems • Solving linear programming problems	6
19.2.04	Matrices	• Definition of matrices • Types of matrices • Determination of order of a matrix • Matrix operations • Determination of determinant of a matrix • Inverse of a matrix • Solving simultaneous equations using matrices	8
19.2.05	Index Numbers	• Definition of index numbers • Uses of index numbers • Types of index numbers • Factors to be considered in construction of index numbers • Problems encountered when constructing index numbers • Computation of index numbers • Limitations of index numbers	8
19.2.06	Time Series	• Definition of time series • Objectives of time series analysis • Component of a time series • Computation of time series components • Decomposition of a time series	8
19.2.07	Network Analysis	• Meaning of network analysis • Terms used in network analysis • Rules used when drawing networks • Construction of project network • Critical path and project duration • Application of network analysis	8

Code	Sub-Module Units	Content	Time (Hours)
19 2 08	Introduction to Calculus	• Definition of calculus • Differentiation of simple functions • Integration of simple functions • Application of calculus	8
19 2 09	Inventory Control Models	• Definition of basic terms used in inventory control • Inventory control limits • Minimization of cost of inventories • Inventory control models	8
19 2 10	Financial Mathematics	• Definition of terms used in financial mathematics • Present and future values • Annuities and perpetuities	8
19 2 11	Probability and Probability Distributions	• Definition of basic terms used in probability • Basic concepts of probability • Laws of probability • Probability distributions • Application of basic probability distribution functions	8
19 2 12	Tests Of Hypothesis	• Definition of hypothesis • Types of hypothesis • Type I and type II errors • Critical and acceptance regions • Z-test and T-test	8
19 2 13	Emerging Trends and Issues in Quantitative Techniques	• Emerging trends and issues in quantitative methods • Challenges posed by emerging trends and issues in quantitative techniques • Coping with challenges posed by emerging trends and issues in quantitative techniques	2
Total			**90**

19.2.01	**INTRODUCTION TO QUANTITATIVE TECHNIQUES**		
	Theory		
19.2.01T	*Specific Objectives* By the end of the sub-module unit, the trainee should be able to: a) explain the meaning of quantitative techniques b) describe the development of quantitative techniques c) explain the role of quantitative techniques d) describe types of quantitative techniques e) identify areas where quantitative techniques are applicable.		
19.2.01C	**Competence** The trainee should have the ability to identify areas where quantitative techniques could be applied in a business set up.		
			Content
		19.2.01T1	Definition of quantitative techniques
		19.2.01T2	Development of quantitative techniques
		19.2.01T3	Role of quantitative techniques
		19.2.01T4	Types of quantitative techniques
		19.2.01T5	Application of quantitative techniques
			Practice
		19.2.01P	*Specific Objective* By the end of the sub-module unit, the trainee should be able to discuss the applicability of quantitative techniques in a business environment
			Content
		19.2.01P1	Applicability of quantitative techniques in a business environment
			Suggested Teaching/Learning Resources - Textbooks - Use of tables - Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Lectures
- Class exercises
- Group Presentations

Suggested Evaluation Methods
- Class assignments
- Oral tests

19.2.02 **CORRELATION AND REGRESSION**

Theory

19.2.02T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define the terms correlation and regression
b) explain the differences and similarities between correlation and regression
c) describe methods of studying correlation
d) interpret the coefficient of correlation
e) formulate linear regression equation
f) explain the use of regression equation in forecasting.

19.2.02C *Competence*
The trainee should have the ability to forecast using correlation and regression in a business set up

Content

19.2.02T1 Definition terms correlation and regression

19.2.02T2 Differences and similarities between correlation and regression

19.2.02T3 Methods of studying correlation

19.2.02T4 Interpretation of correlation coefficient

19.2.02T5 Linear regression equation
- X on Y
- Y on X

19.2.02T6 Forecasting using regression equation

Practice

19.2.02P *Specific Objectives*
By the end of the sub-module unit the trainee should be able to:
a) determine correlation using various methods
b) interpret correlation coefficient
c) compute linear regression equation

Content

19.2.02P1 Determination of coefficient of correlation
- Scatter diagram
- Ranking
- Produce Moment Correlation Coefficient
- Coefficient of determination

19.2.02P2 Interpretation of correlation coefficient

19.2.02P3 Formulation of linear regression equation

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Lectures
- Class exercises
- Presentations

Suggested Evaluation Methods
- Class assignments
- Questions and answers

19.2.03 **LINEAR PROGRAMMING**
Theory

19.2.03T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define linear programming
b) identify the assumptions of linear programming
c) identify the requirements of linear programming
d) describe the formulation of linear equations
e) describe the formulation of linear programming problems
f) explain how to solve linear programming problems.

19.2.03C **Competence**
The trainee should have the ability to optimally allocate scarce resources among competing needs in an organisation

Content

19.2.03T1 Definition of linear programming

19.2.03T2	Assumption of linear programming	*Suggested Teaching/Learning Resources* - Textbooks - Use of tables
19.2.03T3	Requirements of linear programming	
19.2.03T4	Formulation of linear equations	
19.2.03T5	Formulation of linear programming problems	*Suggested Teaching/ Learning Activities* - Group discussions - Lectures - Class exercises - Presentations
19.2.03T6	Solving linear programming problems Graphical method Simplex method	*Suggested Evaluation Methods* - Continuous Assessment Tests - Class assignments - Questions and answers
	Practice	
19.2.03P	*Specific Objectives* By the end of the sub-module unit, the trainee should be able to: a) form linear equations b) formulate linear programming problems c) solve linear programming problems	
	Content	
19.2.03P1	Forming of linear equations	
19.2.03P2	Formulating of linear programming problems	
19.2.03P3	Solving of linear programming problems	

19.2.04	**MATRICES**	
	Theory	
19.2.04T	*Specific Objectives* By the end of the sub-module unit, the trainee should be able to: a) define a matrix b) explain types of matrices c) explain the determination of order of a matrix d) describe matrix operations e) explain how to determine the determinant of a matrix	

f) explain how to determine the inverse of a matrix
g) explain how to solve simultaneous equations using matrices.

19.2.04C **Competence**
The trainee should have the ability to solve simultaneous equations using matrices given a business problem

Content

19.2.04T1 Definition of a matrix
19.2.04T2 Types of matrices
19.2.04T3 Determination of order of a matrix
19.2.04T4 Operations of a matrix
19.2.04T5 Determination of determinant of a matrix
19.2.04T6 Inverse of a matrix
19.2.04T7 Solving simultaneous equations using matrices

Practice

19.2.04P *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) determine the order of a matrix
b) add, subtract and multiply matrices
c) find the inverse of a matrix
d) solve simultaneous equations

Content

19.2.04P1 Determination of order of matrices
19.2.04P2 Adding, subtracting and multiplying of matrices
19.2.04P3 Finding the inverse of a matrix
19.2.04P4 Solving of simultaneous equations

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning e Activities
- Group discussions
- Lectures
- Class exercises
- Presentations

Suggested Evaluation Methods
- Continuous Assessment Tests
- Class assignments
- Term papers

19.2.05 INDEX NUMBERS

Theory

19.2.05T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define index numbers
b) explain the uses of index numbers
c) explain types of index numbers
d) explain factors to be considered in the construction of index numbers
e) identify problems encountered when constructing index numbers
f) explain how to compute index numbers
g) explain limitations of index numbers

19.2.05C **Competence**
The trainee should have the ability to use index numbers to make business decisions

Content

19.2.05T1 Definition of index numbers

19.2.05T2 Uses of index numbers

19.2.05T3 Types of index numbers

19.2.05T4 Factors to be considered in the construction of index numbers

19.2.05T5 Problems encountered when constructing index numbers

19.2.05T6 Computation of index numbers

19.2.05T7 Limitations of index numbers

Practice

19.2.05P *Specific Objective*
By the end of the sub-module unit, the trainee should be able to compute index numbers

Content

19.2.05P1 Computation of index numbers

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Lectures
- Class exercises
- Presentations

Suggested Evaluation Methods
- Continuous Assessment Tests
- Class assignments
- Term papers

19.2.06 TIME SERIES

Theory

19.2.06T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define time series
b) explain the objectives of time series analysis
c) explain the component of a time series
d) explain the computation of time series components
e) explain the decomposition of a time series using various models.

19.2.06C **Competence**
The trainee should have the ability to compute time series components and decompose using times series.

Content

19.2.06T1 Definition of time series

19.2.06T2 Objectives of a time series analysis

19.2.06T3 Components of a time series

19.2.06T4 Computation of time series components
- Free hand method
- Method of semi-averages
- Moving averages
- Exponential smoothing
- Least square method

19.2.06T5 Decomposition of a time series using various model
- Additive model
- Multiplicative model

Practice

19.2.06P *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) compute components of a time series
b) decompose a time series.

Content

19.2.06P1 Computation of time series components

19.2.06P2 Decomposition of a times series

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Lectures
- Class exercises
- Presentations

Suggested Evaluation Methods
- Continuous Assessment Tests
- Class assignments Term papers

19.2.07 NETWORK ANALYSIS

Theory

19.2.07T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) explain the meaning of network analysis
b) explain the basic terms used in network analysis
c) identify the rules used when drawing networks
d) describe the construction of project network
e) explain how to determine critical path and project duration
f) discuss the application of network analysis.

19.2.07C **Competence**
The trainee should have the ability to apply network analysis to solve business problems

Content

19.2.07T1 Meaning of network analysis

19.2.07T2 Types used in network analysis

19.2.07T3 Rules used in network analysis

19.2.07T4 Construction of network analysis

19.2.07T5 Determining critical path and project duration

19.2.07T6 Application of network analysis

Practice

19.2.07P *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) construct project networks
b) determine the critical path and project duration.

Content

19.2.07P1 Constructing of project networks

19.2 07P2 Determining of critical path and project durations

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Lectures
- Class exercises
- Presentations

Suggested Evaluation Methods
- Continuous Assessment Tests
- Class assignments
- Term papers

19.2.08 INTRODUCTION TO CALCULUS

Theory

19.2.08T *Specific Objectives*

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

a) define calculus
b) explain the differentiation of simple functions
c) explain the integration of simple functions
d) discuss the application of calculus.

19.2.08C **Competence**

The trainee should have the ability to apply calculus in solving business problems

Content

19.2.08T1 Definition of calculus

19.2.08T2 Differentiation of simple functions

19.2.08T3 Integration of simple functions

19.2.08T4 Application of calculus

Practice

19.2.08P *Specific Objectives*

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

a) differentiate simple functions
b) integrate simple functions

Content

19.2.08P1 Differentiation of simple functions

19.2.08P2 Integration of simple functions

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Class exercises
- Class Presentations

Suggested Evaluation Methods
- Class assignments
- Term papers

19.2.09 **INVENTORY CONTROL MODELS**

Theory

19.2.09T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define basic terms used in inventory control
b) define inventory control limits
c) explain how to minimize cost of inventories
d) discuss inventory control models.

19.2.09C *Competence*
The trainee should have the ability to apply inventory control techniques in an organisation

Content

19.2.09T1 Definition of basic terms used in inventory control

19.2.09T2 Inventory control limits

19.2.09T3 Minimization of cost of inventories

19.2.09T4 Inventory control models

Practice

19.2.09P *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) calculate the inventory control limits
b) minimize cost of inventories
c) manipulate inventory control models.

Content

19.2.09P1 Calculating inventory control limits

19.2.09P2 Calculating cost of inventories

19.2.09P3 Manipulating inventory control model

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Class exercises
- Presentations

Suggested Evaluation Methods
- Continuous Assessment Tests
- Class assignments
- Term papers

19.2.10 **FINANCIAL MATHEMATICS**

Theory

19.2.10T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define terms used in financial mathematics
b) explain the present and future values
c) explain annuities and perpetuities.

19.2.10C **Competence**
The trainee should have the ability to apply financial mathematics in decision making

Content

19.2.10T1 Definition of terms
19.2.10T2 Present and future values
19.2.10T3 Annuities and perpetuities

Practice

19.2.10P *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) calculate present and future values
b) compute annuities and perpetuities

Content

19.2.10P1 Calculating present and future values
19.2.10P2 Computing annuities and perpetuities

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Training Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Class exercises

Suggested Evaluation Methods
- Term papers
- Oral tests

19.2.11 PROBABILITY AND PROBABILITY DISTRIBUTIONS

Theory

19.2.11T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define basic terms used in probability
b) explain the basic concepts of probability
c) explain the laws of probability
d) describe probability distributions
e) discuss the application of probability distribution functions.

19.2.11C **Competence**
The trainee should have the ability to apply probability distribution concepts in business decision-making

Content

19.2.11T1 Definition of basic terms used in probability
- Events
- Mutually exclusive events
- Equally likely events
- Exhaustive events
- Dependent and Independent events
- Random experiment

19.2.11T2 Basic concepts
- Combinations
- Permutations

19.2.11T3 Laws of probability

19.2.11T4 Probability distributions
- Binomial distributions
- Poisson distributions
- Normal distributions

19.2.11T5 Application of probability distribution functions

Practice

19.2.11P *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) solve business problems using basic concepts of probability
b) distinguish between different events in probability

Content

19.2.11P1 Solving business problems using basic concepts of probability

19.2.11P2 Distinguishing events in probability

Suggested Teaching/Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Class exercises

Suggested Evaluation Methods
- Oral test
- Class assignment

19.2.12 **TESTS OF HYPOTHESIS**

Theory

19.2.12T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) define the term hypothesis
b) explain types of hypothesis
c) define type I and type II errors
d) identify critical and acceptance regions
e) explain the application of Z-tests and T-tests

19.2.12C **Competence**
The trainee should have the ability to test a hypothesis when analyzing business data

Content

19.2.12T1 Definition of hypothesis

19.2.12T2 Types of hypothesis

19.2.12T3 Type I and type II errors

19.2.12T4 Critical and acceptance regions

19.2.12T5 Application of Z-tests and T-tests

Practice

19.2.12P *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) conduct Z-tests of hypothesis for large samples
b) conduct T-tests of hypothesis for small samples
c) determine critical and acceptance regions.

Content

19.2.12P1 Conducting Z-test

19.2.12P2 Conducting T-test

19.2.12P3 Determination of critical and acceptance regions

Suggested Teaching Learning Resources
- Textbooks
- Use of tables
- Manuals

Suggested Teaching/ Learning Activities
- Group discussions
- Class exercises

Suggested Evaluation Methods
- Oral tests
- Assignment

19.2.13 **EMERGING TRENDS AND ISSUES IN QUANTITATIVE TECHNIQUES**

Theory

19.2.13T *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
a) identify the emerging trends and issues in quantitative techniques
b) discuss the challenges posed the emerging trends and issues in quantitative techniques
c) discuss ways of coping with the emerging trends and issues in quantitative techniques

19.2.13C **Competence**
The trainee should have the ability to cope with emerging issues and trends in quantitative techniques in a business set up

Content

19.2.13T1 Emerging issues and trends in quantitative techniques

19.2.13T2 Challenges posed by emerging issues and trends quantitative techniques

19.2.13T3 Coping with challenges posed by emerging issues and trends in quantitative techniques

Practice

19.2.13 P *Specific Objective*
By the end of the sub-module unit, the trainee should be able to discuss the emerging issues and trends in quantitative techniques

19.2.13P1	*Content* Class Discussion on emerging trends and issues in quantitative techniques *Suggested Teaching/Learning Resources* - Textbooks - Use of tables - Manuals	*Suggested Teaching/ Learning Activities* - Group discussions - Class exercises *Suggested Evaluation Methods* - Class assignments - Written report

20.2.0 OFFICE ADMINISTRATION AND MANAGEMENT I

20.2.1 Introduction

This module is intended to equip the trainee with knowledge, skills and attitude that will enable him/her perform office administration and management functions effectively.

20.2.2 General Objectives

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

a) explain the basic principles and concepts necessary for efficient and effective management of an office
b) describe the duties and responsibilities of various office personnel
c) cope with the emerging trends and issues in office administration and management.

20.2.3 Module Unit Summary and Time Allocation

Code	Sub-Module Unit	Content	Time (Hours)
20.2.01	Introduction to Office Administration and Management	• Definition of terms office administration and management • Distinction between office administration and management • Scope of office administration and management	4
20.2.02	Organisation Structures and Departments	• Types of organisation structures and their charts • Various departments in an organisation • Functions of various departments • Relationship between departments	10
20.2.03	Office Organisation	• Meaning of organisation • Principles of organisation • Delegation of authority	10

		• Span of control • Centralization and decentralization of office services	
20.2.04	The Office	• Meaning of an office • Functions of an office • Types of office layout • Features of a modern office	10
20.2.05	The Office Personnel	• Types of office personnel • Duties and responsibilities of various office personnel • Qualities required of various office personnel • Role of human relations in an office	8
20.2.06	Office Furniture and Stationery	• Meaning of office furniture • Types of office furniture and their uses • Procuring office furniture • Definition of stationery • Procuring office stationery • Uses of office stationery	8
20.2.07	Handling Office Correspondence	• Types of office correspondence • Procedure of handling incoming correspondence • Procedure of handling outgoing correspondence	6
20.2.08	Filing and Storage of Records	• Meaning of filing • Various filing systems • Methods of classifying documents • Uses of filing equipment • Follow-up methods in filing and storage of records	8
20.2.09	Reprography	• Definition of reprography • Methods used in	6