

14.2.0 MATHEMATICS II

14.2.01 INTRODUCTION

This module unit is designed to equip the trainee with the relevant mathematical knowledge, skills, techniques and attitudes necessary to enhance better understanding and application of mathematics in the respective trade.

14.2.02 GENERAL OBJECTIVES

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

- a) use mathematical concepts and techniques in solving problems related to respective trade
- b) organize, draw simple deductions and conclusions from the given data
- c) interpret graphical representation of functions relevant to the respective trade area

14.2.0 MODULE UNIT AND TIME ALLOCATION

MATHEMATICS II

Code	Sub Module Unit	Content	Time
14.2.1	Probability	<ul style="list-style-type: none">• Definition of probability• Laws of probability• Expectation variance and S.D.• Types of distributions• Mean, variance and SD of probability distributions• Application of probability distributions	10
14.2.2	Statistics	<ul style="list-style-type: none">• Definition of statistics• Measures of centre tendency• Measures of dispersion	8
14.2.3	Sequence and Series	<ul style="list-style-type: none">• Sequence and series• Simple and compound interest• Arithmetic and geometric progressions	6
14.2.4	Vectors	<ul style="list-style-type: none">• Operation of vectors• Resolution of vectors into vertical and horizontal components• Relative velocity	4
14.2.5	Mensurations	<ul style="list-style-type: none">• Units of measurements• Perimeters, areas, volumes of	4

		<ul style="list-style-type: none"> regular figures and solids • Area of irregular figures 	
14.2.6	Integral Calculus	<ul style="list-style-type: none"> • Definition of integration • Indefinite and definite integrals • Methods of integration • Application of integration 	8
14.2.7	Differential Calculus	<ul style="list-style-type: none"> • Definition of derivative of a function • Differentiation from first principle • Tables of some common derivatives • Rules of differentiation • Higher order derivatives • Definition of partial derivative • Partial differentiation for function of two variables • Application of partial differentiation to small changes, stationary points, curve sketching and rates of change 	14
14.2.8	Power Series	<ul style="list-style-type: none"> • Definition of the term power series • Taylor's theorem • Deduction of Maclaurin's theorem from Taylor's theorem • Use Taylor's theorem to obtain power series • Use Maclaurin's theorem to obtain power series • Application of Taylor's theorem and Maclaurin's theorems in numerical work 	12
Total Time			66

14.2.1 PROBABILITY

14.2.1T0 *Specific Objectives*

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

- a) define the terms probability
- b) state and apply the laws of probability
- c) determine the expected value, variance and standard deviation
- d) illustrate the different types of distributions
- e) calculate the mean, variance and standard deviation of probability functions
- f) apply the knowledge of probability distribution to solve practice problems

14.2.1C **Competence**

The trainee should have the ability to work out mathematical problems related to probability

Content

- 14.2.1T1 Definition of probability
- 14.2.1T2 Laws of probability
- 14.2.1T3 Expectation variance and S.D
- 14.2.1T4 Types of distributions
- 14.2.1T5 mean, variance and SD

of probability distributions

- 14.2.1T6 Application of probability distributions

Suggested Learning Resources

- i) Calculates
- ii) Charts
- iii) Audio visual media

14.2.2 STATISTICS

14.2.2T0 *Specific Objectives*

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

- a) define statistics
- b) determine measures of central tendency
- c) determine measures of dispersion

14.2.2C **Competence**

The trainee should have the ability to apply statistical knowledge to engineering

Content

- 14.2.2T1 Definition of statistics
- 14.2.2T2 Measures of centre tendency
- 14.2.2T3 Measures of dispersion

Suggested Learning Resources

- i) Print media
- ii) Audio media
- iii) Real live experience

14.2.3 SEQUENCE AND SERIES

- 14.2.3T0 *Specific Objectives*
By the end of the sub module unit, unit the trainee should be able to:
- a) distinguish between a sequence and a series
 - b) solve problems involving in series
 - c) apply the knowledge of series in calculating simple and compound interest

- 14.2.3C Competence**
The trainee should have the ability to apply sequence and series to engineering problems

Content

- 14.2.3T1 Sequence and series
- 14.2.3T2 Arithmetic and geometric progressions
- 14.2.3T3 Simple and compound interest

Suggested Learning Resources

- i) Charts
- ii) Mathematical tables
- iii) Calculators
- iv) Light-angled triangles
- v) Real life experience

14.2.4 VECTORS

- 14.2.4T0 *Specific Objectives*
By the end of the sub module unit, unit the trainee should be able to:
- a) carry out operations on vectors
 - b) resolve vectors into horizontal and vertical components
 - c) determine relative velocity

- 14.2.4C Competence**
The trainee should have the ability to ability to solve problems in vectors

Content

- 14.2.4T 1 Operation of vectors
- 14.2.4T 2 Resolution of vectors into vertical and horizontal components
- 14.2.4T 3 Relative velocity

Suggested Learning Resources

- i) Charts
- ii) Real life situations

14.2.5 MENSURATIONS

- 14.2.5 T0 *Specific Objectives*
By the end of the sub module unit, unit the trainee should be able to:
- a) state different units of measurements
 - b) calculate perimeters, areas, volumes of regular

- figures and solids
- c) use appropriate methods to calculate areas of irregular figures

14.2.5 Competence

The trainee should have the ability to work out problems related to mensurations

Content

- 14.2.5T1 Units of measurements
- 14.2.5 T2 Perimeters, areas, volumes of regular figures and solids
- 14.2.5 T3 Area of irregular figures

Suggested Learning Resources

- i) Charts

14.2.6 INTEGRAL CALCULUS

- 14.2.6 *Specific Objectives*
By the end of the sub module unit, unit the trainee should be able to:
 - a) define integration
 - b) differentiate between indefinite and definite integrals
 - c) solve problems involving various methods of integration
 - d) apply integration to real life situations

14.2.6C Competence

The trainee should have the ability to apply knowledge in integral calculus to engineering

Content

- 14.2.6T1 Definition of integration
- 14.2.6T2 Indefinite and definite integrals
- 14.2.6T3 Methods of integration
- 14.2.6T4 Application of integration

Suggested Learning Resources

- i) Charts
- ii) Squared grid-board
- iii) Calculators

14.2.7 DIFFERENTIAL CALCULUS

- 14.2.7T0 *Specific Objectives*
By the end of the sub module unit, unit the trainee should be able to:
 - a) define the derivative of a function
 - b) differentiate from first principle
 - c) refer to tables of derivatives of some common functions
 - d) state and use rules of differentiation
 - e) determine the derivative of higher order
 - f) define partial

- derivatives of two variables
- g) differentiate partially functions of two variables
- h) apply differentiation to stationary points curve sketching rates of change, small changes
- i) solve problems involving small changes using partial fractions
- j) find stationary points for functions of two variables

14.2.7 Competence

The trainee should have the ability to apply differential calculus engineering

Content

- 14.2.7T1 Definition of derivative of a function
- 14.2.7T2 Differentiation from first principle
- 14.2.7T3 Tables of some common derivatives
- 14.2.7T4 Rules of differentiation
- 14.2.7T5 Higher order derivatives
- 14.2.7T6 Definition of partial derivative
- 14.2.7T7 Partial differentiation for function of two variables
- 14.2.7T8 Application of partial differentiation to small changes, stationary points, curve

sketching and rates of change

- 14.2.7T9 Problems on small changes using partial fractions
- 14.2.7T10 Stationary points for functions of two variables

Suggested Learning Resources

- i) Tables
- ii) Calculators

14.2.8 POWER SERIES

- 14.2.8T0 *Specific Objectives*
By the end of the sub module unit, unit the trainee should be able to:

- a) define the term power series
- b) state Taylor's theorem
- c) deduce Maclaurin's theorem from Taylor's theorem
- d) use Taylor's theorem to obtain power series
- e) use Maclaurin's theorem to obtain power series
- f) apply Taylor's and Maclaurin's theorems of numerical work

Content

- 14.2.8T1 Definition of the term power series
- 14.2.8T2 Taylor's theorem
- 14.2.8T3 Deduction of Maclaurin's theorem from Taylor's theorem

- 14.2.8T4 Application of Taylor's theorem to obtain power series
- 14.2.8T5 Use Maclaurin's theorem to obtain power series
- 14.2.8T6 Application of Taylor's theorem and Maclaurin's theorems in numerical work

Suggested Learning Resources
i) Calculators

easyvet.com