



**NATIONAL BOARD FOR TECHNICAL
EDUCATION (NBTE)**

COURSE MATERIAL

FOR

**Course Code & Title: MTH 111 LOGIC AND
LINEAR ALGEBRA**

**Programme: NATIONAL DIPLOMA IN
COMPUTER SCIENCE**

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Tel: +234 XXXXXXXXXXXXX

E-mail: XXXXXXXXXXXXXXX

COURSE WRITERS/DEVELOPMENT TEAM

Subject Matter Expert	Mohammed Suleman Lawan
Subject Matter Reviewer	Mr. Bolaji Abdulyakeen
Language Reviewer	Dr. Hassan Suleiman
Instructional Designer	Dr Fatima Shehu Kabir
Graphics Designers	Jibril Jabir Abdulkadir Ibrahim Umar Shu'aibu Abubakar Balarabe
Editor	Prof. Hassan Zoaka Dr. Ajoge Naseer Sanni

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COURSE STUDY GUIDE

i. Course Information

Course Code: MTH111

Course Title: Logic and Linear Algebra

Credit Units: 2 Credit Units

Year of Study: One

Semester: First

ii. Course Introduction and Description

Logic is one of the most interesting and important topics you will ever study. Logic teaches us how to recognize good and bad arguments. Evaluating arguments is a skill common to Mathematics, physics, psychology, and any other intellectual field. Logic help us to construct good arguments, evaluate reasons, and know when they should, and should not, be convincing. In recent years, Linear algebra has become an important mathematical background needed by mathematicians, engineers, computer scientists, physicists, economists, and statisticians, among others. This shows the wide applications of the topic.

During this course, you will be thought the meaning of negation, conjunction, disjunction, implication, bi-implication, and tautology, universal and existential quantifier. Different types truth tables will be exposed to you. Details explanation on permutation and combination will be provided. You will learn binomial expansion, algebraic operation of matrixes and determinant.

This course will provide you with basic knowledge of logic and linear algebra and will assist you in writing computer programs.

iii. Course Prerequisites

You are required to have the following to be qualified for this course.

1. Five credits in SSCE certificate
2. Basic Computer Operations proficiency
3. Online interaction proficiency
4. Web 2.0 and Social media interactive skill.

iv. Course Learning Resources

- **Bruce Ikenaga, 2020, Logical Connectives,** <https://sites.millersville.edu/bikenaga/math-proof/logical-connectives/logical-connectives.pdf>
-] Bruce Ikenaga, 2020, Truth Tables, Tautologies and Logical Equivalence,,<https://sites.millersville.edu/bikenaga/math-proof/truth-tables/truth-tables.html>
- P. Keef and D. Guichard, n.d., Introduction to Higher Mathematics, Quantifiers, https://www.whitman.edu/mathematics/higher_math_online/section01.02.html
- The Institute of Chartered Accountants of India, n.d., Business Mathematics and Logical Reasoning, Chapter 5 Basic Concepts of Permutations and Combinations, <https://ca-foundation.in/wp-content/uploads/2018/06/Chapter-5-Basic-Concepts-of-Permutations-and-Combinations.pdf>
- Maths is Fun, n.d., Mathematical Induction, <https://www.mathsisfun.com/algebra/mathematical-induction.html>
- Onlinemaths4all, n.d., Pascal’s Triangle and the Binomial Theorem, <https://www.onlinemath4all.com/pascal-triangle-and-the-binomial-theorem.html>
- Mathcentre, 2009, Pascal’s Triangle and the Binomial Theorem,<http://www.mathcentre.ac.uk/resources/uploaded/mc-ty-pascal-2009-1.pdf>
- Global Online Maths, n.d., Binomial Theorem: Proof by Mathematical Induction, <https://medium.com/mathadam/binomial-theorem-proof-by-mathematical-induction-1c0e9265b054>
- [2] Interactive Mathematics, 2020, The Binomial Theorem, <https://www.intmath.com/series-binomial-theorem/4-binomial-theorem.php#:~:text=%20The%20Binomial%20Theorem%20%20>
- Mark Kudlowski, n.d., The Binomial Series for Rational Powers, http://mkhometuition.co.uk/index_files/A2-50_Binomial_Series_Rational.pdf#:~:text=THE%20BINOMIAL%20SERIES%20FO R%20
- Exp11, 2019, Properties of Matrix Addition, <https://www.exp11.com/t/properties-of-matrix-addition-5142>
- Interactive Mathematics, 2018, Multiplication of Matrices,<https://www.intmath.com/matrices-determinants/4-multiplying-matrices.php>
- Byjus, n.d., Determinant of a Matrix, <https://byjus.com/jee/determinants/#multiplication-of-two-determinants>
- ChiliMath, 2020, The Formula of the Determinant of 3x3 matrix <https://www.chilimath.com/lessons/advanced-algebra/determinant-3x3-matrix/>
- Byjus, n.d., Minors and Cofactors, <https://byjus.com/jee/minors-and-cofactors/>

v. Course Objectives

This course shall among others ensure that you:

1. Discuss the concept of logic and abstract thinking

2. Understand the concept of permutations and combination
3. Illustrate Binomial expansion of algebraic expression
4. Understand the algebraic operations of matrixes and determinants

vi. Activities to Meet the Course Objective

The course material is written in a simple and concise way that will help you understand this course and encourage you to understand it very well. Logic is a very interesting topic that you will enjoy studying it. For you, appropriate sites and standard references have been given. In this class, there will be a lot of chatting and online networking through WhatsApp, Facebook and Instagram. Individual and group assignments will take place. No late assignment from you will be entertained or acknowledged and thus, with your report, be very serious. Completion and prompt submission of tasks can also act as part of the evaluation. You are supposed to read carefully and grasp this course material very well. On your cell phones, you are also supposed to have software applications such as WhatsApp, Facebook and Instagram, a working email address and a phone number so that you can talk, connect and exchange ideas with each other. Please do not hesitate to use my email addresses, phone numbers and social media sites to contact me. Please do not hesitate to use my email addresses, phone numbers and social media sites to contact me. Thank you and bless God.

vii. Time (To Complete Course)

The length of tutoring is 13 weeks and you are required to put in at least 2 hours of weekly study time.

viii. Grading Criteria and Scale

Grading Criteria

Grades will be based on the following:

Individual assignments/test (CA 1,2 etc.)	20%
Group assignments (GCA 1, 2 etc.)	10%
Discussions/Quizzes/Out of class engagements etc.	10%
<u>Semester Examination</u>	<u>60%</u>
TOTAL	100%

ix. Grading Scale

A = 70 – 100

B = 60 – 69

C = 50 – 59

D = 40 – 49

F = 0 – 39

x. Feedback

Courseware based:

- 1. Self-assessment questions and answers**

Tutor based:

- 1. Discussion Forum tutor input**
- 2. Graded Continuous assessments**

Student based:

- 1. Online programmed assessment**

i. LINKS TO OPEN EDUCATION RESOURCES

<http://oss-watch.ac.uk/resources/tips> provides tips for selecting open source, or for procuring free or open software.

<https://schoolforge.net/> are good places to find, create, and publish open software.

SourceForge, for one, has millions of downloads each day.

Numerous open or open educational resource databases and search engines exist. Some examples include:

- <https://oedb.org/>: over 10,000 free courses from universities as well as reviews of colleges and rankings of college degree programmes
- <https://www.oercommons.org/>: over 40,000 open educational resources from elementary school through to higher education; many of the elementary, middle, and high school resources are aligned to the Common Core State Standards

- <http://www.opencontent.org/>: a blog, definition, and game of open source as well as a friendly search engine for open educational resources from MIT, Stanford, and other universities with subject and description listings
- <https://academicearth.org/>: over 1,500 video lectures from MIT, Stanford, Berkeley, Harvard, Princeton, and Yale
- <https://openeducationalresources.pbworks.com/w/page/27045418/Finding%20OERs>: Joint Information Systems Committee works on behalf of UK higher education and is involved in many open resources and open projects including digitising British newspapers from 1620-190

Please Contact NBTE for the Complete Courseware