



NATIONAL OPEN UNIVERSITY OF NIGERIA

SCHOOL OF ARTS AND SOCIAL SCIENCES

COURSE CODE:PHL201

**COURSE TITLE:INTRODUCTION TO LOGIC AND CRITICAL
THINKING**

**COURSE
GUIDE**

**PHL201
INTRODUCTION TO LOGIC AND CRITICAL THINKING**

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Introduction

PHL201: Introduction to Logic and Critical Thinking is a one semester, three-credit unit course. It is made up of 21 units which analyse the critical nature of thinking and clarity of thought. It also analyses argument into its basic parts. Sound and unsound arguments, Logical proofs and symbolising are emphasised.

There are no compulsory pre-requisites for this course. The course guide tells you briefly what the course is all about, what you are expected to know in each unit, what course materials you will be using and how you can work your way through these materials. It also emphasises the need for Tutor-Marked Assignments. Detailed information on Tutor-Marked Assignments is found in a separate file, which will be sent to you later. There are periodic tutorial classes that are linked to the course.

Course Aims

The major aim of this course is to help you understand and have knowledge of what Logic and Critical Thinking is all about. This will be achieved by:

- 2.0 defining philosophy
- 3.0 knowing the major branches of philosophy
- 4.0 introducing you to the definition, nature and stages of logical thinking
- 5.0 distinguishing between ordinary language and logic
- 6.0 analysing ambiguity, validity, soundness, vagueness and fallacies.

Course Objectives

To achieve the aims set out above, there are set objectives. In addition, each unit also has specific objectives. The unit objectives are always at the beginning of a unit. You should read them before you start working through the unit; you may want to refer to them during your study of the unit to check on your progress. You should always look at unit objectives after completing a unit. In this way you will be surer of having done what was required of you in the unit.

Stated below are the wider objectives of this course as a whole. By meeting these objectives, you should have achieved the aims of the course as a whole.

On successful completion of the course, you should be able to:

- define philosophy
 - i. list about the major branches of philosophy

- ii. explain about the sources of knowledge and criteria for knowing
- iii. discuss knowledge of Logic and critical thinking
- iv. outline the relevance / usefulness of Logic as a discipline
- v. distinguish sound from unsound argument deductive inductive arguments
- vi. discuss language and its functions
- vii. analyse the different types of fallacies
- viii. discuss the different laws of thought

What You Will Learn in this Course

The overall aim of PHL201: Introduction to Logic and Critical Thinking is to introduce you to the actual definition, nature and Scope of Logic. This course also attempts to analyse the meaning of sound and unsound arguments, uses of language, fallacies, definitions, propositions and the laws of thought. This course will also teach you how to differentiate argument from non-argument. Thus your understanding of Logic and critical thinking will equip you with knowledge of what Logic is all about as well as its influence on other disciplines.

Working through this Course

To complete this course, you are required to read the study units, read recommended books and read other materials. Each unit contains self-assessment exercises, and at some point in the course you will be required to submit assignments for assessment. Below you will find listed all the components of the course and what you have to do.

Course Materials

Major components of the course are:

- Course Guide
- Study Units
- Textbooks
- Assignment File
- Presentation Schedule

In addition, you must obtain the materials. Obtain your copy. You may contact your tutor if you have problems in obtaining the text materials.

Study Units

There are four (4) modules and twenty one study units in this course as follows:

Module 1

Unit 1	Definition and Scope of Philosophy
Unit 2	Philosophy as the Parent Discipline
Unit 3	Branches of Philosophy
Unit 4	Philosophy and Other Disciplines
Unit 5	Sources of Knowledge and Criteria for Knowing

Module 2

Unit 1	Definition and Scope of Logic
Unit 2	Logic's Vocabulary I
Unit 3	Logic's Vocabulary II
Unit 4	Valid, Invalid, Deductive and Inductive Arguments
Unit 5	Language and its Functions

Module 3

Unit 1	Fallacies (Part One)
Unit 2	Fallacies (Part Two)
Unit 3	Definitions (Part One)
Unit 4	Definitions (Part Two)
Unit 5	Categorical Propositions

Module 4

Unit 1	Syllogisms
Unit 2	Symbolising in Logic
Unit 3	Truth Table Analysis
Unit 4	Logical Proofs of Validity Using Truth Tables
Unit 5	Rules of Inference and Argument Forms
Unit 6	Laws of Thought

Textbooks and References

The following textbooks are recommended:

Copi, I. M. (1968). *Introduction to Logic*. London: Macmillan.

Kahane, Howard. (1968). *Logic and Philosophy*. California: Wadsworth.
Otakpor, Nkeonye. (2000). *A Preface to Logic*. Benin City: Omone Books.

Minimah, F. and V. Inoka. (1997). *A Concise Introduction to Philosophy and Logic*. Ikot Ekpene: Belpot.

Neneye, E. P. (2003). *Introduction to Logic and Philosophy*. Owerri: Prosperity Publishers.

Uduigwomen, A.F. and G.O. Ozumba. (2000). *A Concise Introduction to Philosophy and Logic*. Calabar: Centaur Publishers.

O'Connor, D.J. and B. Powell. (1980). *Elementary Logic*. London: Hodder.

Assignment File

In the Assignment File, you will get the details of the work you are expected to submit to your tutor for marking. The marks you obtain from these assignments will count towards the final mark you obtain for this course. Further information on the assignments is in the Assessment File itself and later in this Course Guide in the section on assessment.

Presentation Schedule

The presentation schedule included in your course materials gives you the important dates for the completion of tutor-marked assignments and the dates to attend tutorials. Remember, you are required to submit all your assignments by the due dates. You should guard against falling behind your work.

Assessment

There are two aspects to the assessment of the course; one is the tutor-marked assignments; second, is a written examination.

In tackling the assignments, you are expected to apply the information and knowledge acquired in this course.

The assignments must be submitted to your tutor for formal assessment in accordance with the deadlines stated in the Assignment File. The work you submit to your tutor for assessment will count for 30% of your total course mark.

At the end of the course, you will need to sit for a final three-hour examination. This will also count for 70% of your total course mark.

Tutor-Marked Assignments

There are 21 tutor-marked assignments in this course. You need to submit all the assignments. The best four (i.e. the highest four of the

fourteen scores) will be counted. The total marks for the best four assignments will be 30 per cent of your total course mark.

Assignment questions for the units in this course are contained in the Assignment File. You should be able to complete your assignments from the information and materials contained in your textbooks, reading and study units. However, you are advised to use other references to broaden your viewpoint and provide a deeper understanding of the subject.

When you have completed each assignment, send it, together with the Tutor-marked assignment (TMA) to your tutor. Make sure that each assignment reaches your tutor on or before the deadline given in the Assignment File. If, however, you cannot complete your work on time, contact your tutor before the assignment is due to discuss the possibility of an extension.

Final Examination and Grading

The final examination of PHL201: Introduction to Logic and Critical Thinking will be of three hours duration and will have a value of 70% of the total course grade. The examination will consist of questions which reflect the type of self-testing, practice exercises and tutor-marked problems you have come across. All areas of the course will be assessed.

You are advised to revise the entire course after studying the last unit before you sit for the examination. You will find it useful to review your tutor-marked assignments and the comments of your tutor on them before the final examination.

Course Marking Scheme

This table shows how the actual course is broken down.

Assessment	Marks
Assignments 1-21	Twenty – one assignments, best four of the twenty – one count as 30% of course marks
Final Examination	70% of overall course marks
Total	100% of course marks

Table 1: Course Marking Scheme

Course Overview

This table brings together the units, the number of weeks you should take to complete them, and the assignments that follow them.

Unit	Title of Work	Week's Activity	Assessment (End of Unit)
	Course Guide	1	
Module 1			
1	Definition and Scope of Philosophy	1	Assignment 1
2	Philosophy as Parent Discipline	2	Assignment 2
3	Branches of Philosophy	3	Assignment 3
4	Philosophy and other Disciplines	4	Assignment 4
5	Sources of Knowledge and Criteria for Knowing	5	Assignment 5
Module 2			
1	Definition and Scope of Logic	6	Assignment 6
2	Logic's Special Vocabulary1	7	Assignment 7
3	Logic's Special Vocabulary 11	8	Assignment 8
4	Deductive and Inductive Arguments	9	Assignment 9
5	Language and its functions	10	Assignment 10
Module 3			
1	Fallacies (Part One)	11	Assignment 11
2	Fallacies (Part Two)	12	Assignment 12
3	Definitions (Part One)	13	Assignment 13
4	Definitions (Part Two)	14	Assignment 14
5	Categorical propositions	15	Assignment 15
Module 4			
1	Syllogisms	16	Assignment 16
2	Symbolising in logic	17	Assignment 17
3	Truth Table Analysis	18	Assignment 18
4	Logical Proofs of Validity Using Truth Tables	19	Assignment 19
5	Rules of Inference and Argument Forms	20	Assignment 20
6	Laws of Thought	21	Assignment 21

Table 2: Course Overview

How to Get the Most from This Course

In distance learning the study units replace the university lecturer. This is one of the great advantages of distance learning; you can read and work through specially designed study materials at your own pace, and at a time and place that suit you best. Think of it as reading the lecture instead of listening to a lecturer. In the same way that a lecturer might set you some reading to do, the study units tell you when to read your set books or other materials. Just as a lecturer might give you an in-class exercise, your study units provide exercises for you to do at appropriate points.

Each of the study units follows a common format. The first item is an introduction to the subject matter of the unit and how a particular unit is integrated with the other units and the course as a whole. Next is a set of learning objectives. These objectives let you know what you should be able to do by the time you have completed the unit. You should use these objectives to guide your study. When you have finished the units you must go back and check whether you have achieved the objectives. If you make a habit of doing this you will significantly improve your chances of passing the course.

The main body of the unit guides you through the required reading from other sources. This will usually be either from your set books or from a reading section.

Reading Section

Remember that your tutor's job is to help you. When you need help, don't hesitate to call and ask your tutor to provide it.

- Read this Course Guide thoroughly.
- Organise a study schedule. Refer to the 'Course Overview' for more details. Note the time you are expected to spend on each unit and how the assignments relate to the units. Whatever method you chose to use, you should decide on and write in your own dates for working on each unit.
- Once you have created your own study schedule, do everything you can to stick to it. The major reason that students fail is that they fall behind in their course work. If you have any difficulties with your schedule, please let your tutor know before it is too late for help.
- Turn to Unit 1 and read the introduction and the objectives for the unit.
- Assemble the study materials. Information about what you need for a unit is given in the "Overview" at the beginning of each unit. You will almost always need both the study unit you are working on and one of your set books on your desk at the same time.
- Work through the unit. The content of the unit itself has been arranged to provide a sequence for you to follow. As you work through the unit you will be instructed to read sections from your set books or other articles. Use the unit to guide your reading.

- Review the objectives for each study unit to confirm that you have achieved them. If you feel unsure about any of the objectives, review the study material or consult your tutor.
- When you are confident that you have achieved a unit's objectives, you can then start on the next unit. Proceed unit by unit through the course and try to pace your study so that you keep yourself on schedule.
- When you have submitted an assignment to your tutor for marking, do not wait for its return before starting on the next unit. Keep to your own schedule. When the assignment is returned, pay particular attention to your tutor's comments, both on the tutor-marked assignment form and also on what is written on the assignment. Consult your tutor as soon as possible if you have any questions or problems.
- After completing the unit, review the course and prepare yourself for the final examination. Check that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in this Course Guide).

Facilitators/Tutor and Tutorials

There are eight hours of tutorials provided in support of this course. You will be notified of the dates, times and location of these tutorials, together with the name and phone number of your tutor, as soon as you are allocated a tutorial group.

Your tutor will mark and comment on your assignments, keep a close watch on your progress and on any difficulties you might encounter and provide assistance to you during the course. You must mail your tutor-marked assignments to your tutor well before the due date (at least two working days are required). They will be marked by your tutor and returned to you as soon as possible.

Do not hesitate to contact your tutor by telephone, e-mail, or during discussions if you need help. The following might be circumstances in which you would find help necessary.

Contact your tutor if:

- You do not understand any part of the study units or the assigned readings,
- You have difficulty with the self-tests or exercises,

- You have a question or problem with an assignment, with your tutor's comments on an assignment or with the grading of an assignment.

You should try your best to attend the tutorials. This is the only chance to have face to face contact with your tutor and to ask questions which are answered instantly. You can raise any problem encountered in the course of your study. To gain the maximum benefit from course tutorials, prepare a question list before attending them. You will learn a lot from participating in discussions actively.

Summary

Introduction to Logic and Critical Thinking intends to introduce you to the basis of correct reasoning. Upon completing this course, you will be able to answer questions such as:

- Who is a Logician?
- What is the difference between argument and non – argument?
- How many Laws of thought do you know?
- What is the Logical implication of Ambiguity, Validity, Vagueness, and Fallacies?
- Has Logic any use?
- What is Philosophy?
- What are the Branches of Philosophy you know?
- What are the sources of knowledge and Criteria for knowing?

Of course, the questions you will be able to answer are not limited to the above list. Introduction to Logic and Critical Thinking is a broad and very exciting study.

We wish you success with the course and hope that you will find it both interesting and useful as well.

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MODULE 1

INTRODUCTION

This first module is made up of five study units. It is a great opportunity for you to know about the Definition and Scope of Philosophy (Unit 1). This module will also teach you why Philosophy as a discipline is the parent discipline, i.e. the parent of all disciplines (Unit 2). In Unit 3, you will learn the major branches of philosophy. Units 4 and 5 will discuss the relationship between philosophy and other disciplines as well as discuss the different sources of knowledge and criteria for knowing.

Unit 1	Definition and Scope of Philosophy
Unit 2	Philosophy as the Parent Discipline
Unit 3	Branches of Philosophy
Unit 4	Philosophy and Other Disciplines
Unit 5	Sources of Knowledge and Criteria for Knowing

UNIT 1 DEFINITION AND SCOPE OF PHILOSOPHY

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 What is Philosophy?
 - 3.2 Layman's Understanding of Philosophy
 - 3.3 Academic Conception of Philosophy
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the definition and scope of philosophy as a discipline. The unit will focus particularly on the complex nature of the definition of philosophy, the way both layman and academics interpret philosophy.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define philosophy as a discipline
- identify the complex nature of the definition of philosophy
- discuss the layman or popular conception of philosophy
- discuss the philosopher's understanding of his own discipline.

3.0 MAIN CONTENT

3.1 What is Philosophy?

Whenever a question such as what is philosophy is asked, no straightforward answer can be given. Because of the complex nature of the discipline it is not easy to define philosophy in a way acceptable to every philosopher. For instance, it is easy to ask a student of biology or physics what the definition of their respective disciplines are and get a straight forward answer. But this is not possible with philosophy. Philosophy as a discipline does not have a universal definition. So the first problem a student of philosophy encounters is that of the definition of philosophy. Philosophers do not agree among themselves on what philosophy is. Either they run away from defining the subject or they mostly do so according to their various schools of thought, culture and even tradition. That is why for most introductory textbooks on philosophy, the best way to define philosophy is to do philosophy, (Popkin 1982: XV).

But you should remember that even if there is an element of truth in this approach, the logic behind it is not hundred percent correct. You do not necessarily need to practice something before you explain or understand it. For instance, someone interested in the definition of death does not necessarily need to die before he explains or understands it. If he is told that the only way to define death is to die first, he is likely to give up the attempt. Even if the best way to define philosophy is to expose the student to the rigours of deep philosophising, this remains partial. What you should always have in mind is that when a student of philosophy asks a question "what is Philosophy" he has started philosophising and to philosophise is to wonder about life and about the fundamental problems of human existence

SELF ASSESSMENT EXERCISE 1

What is philosophy?

3.2 Layman's Understanding of Philosophy

In the absence of a universal definition or understanding of philosophy, the discipline has been given various meanings and definitions. This section focuses on one aspect only which is the conception of the discipline by the layman. And by *layman*, I mean the average man-in-the-street. According to William Halverson, there is a popular belief of the meaning of philosophy, and since this is one of the common ways in which people who are not professional philosophers understand and use the term, it is one of the strongest impressions that people have of philosophy (1967:4).

My Philosophy of Life

To the average man-in-the-street, philosophy is used first to mean “an attitude towards a certain line of action”, a ‘general view of life or a general theory or principles about how we ought to conduct our lives” (Halverson, 1967: 4). That is why in the street if you ask a common man: “What is your philosophy of life”? You will get answers such as: “My philosophy of life is to take things gently” or “I don’t like the philosophy of the capitalist system of government”. You can see here that for a layman, a person’s philosophy becomes “the sum total of his fundamental beliefs and convictions” that is, the main principles that guide or control his life. To Halverson, this impression of philosophy is understood to have a very practical orientation. And a philosophy of life... include views on such things as the nature of man and man’s place in the universe, some convictions about what things are worth and so on (1967:4).

Taking Things Philosophically

This is another way the common man understands philosophy. You can remember that in our daily lives sometimes when someone loses a very close relation, he is advised to take it philosophically. For H. Harold, this implies that the individual sees the problem in its broad perspectives or as part of a large scheme of things: hence he faces the situation calmly and reflectively with poise and composure (1997:10).

In this situation, “taking the loss of someone philosophically” simply means that the person rationalised death believing that whatever will be, will be irrespective of whatever any man may think or do.

And for Joseph I. Omoregbe, whatever happens happens necessarily and “there is nothing any man can do to prevent it from happening” (1989:26). The person’s intention here is to see birth and death as part of the universal scheme. In other words birth and death are all part of life.

Being a Philosopher or Getting Philosophical

You can remember that in our daily lives, when two individuals engage themselves in an argument on a given topic and one excels in sustaining his position in a systematic, logical and consistent manner, the person is often qualified as “being a philosopher”.

At other times, when someone makes an imprecise and vague statement about something, that is, a statement that cannot be easily explained or understood, to a layman, the person is simply “getting Philosophical”.

In conclusion, you should always remember that to the layman, philosophy is concerned with matters that are uncommon, profound, beyond the understanding of most men, or at worst simply vague and imprecise.

SELF ASSESSMENT EXERCISE 2

Discuss the layman’s understating of philosophy.

3.3 Academic Conception of Philosophy

As stated earlier, there is no straight forward answer to the question: “what is philosophy?” We have two ways to understand philosophy. The first way is that of the layman as discussed above. The second is the concern of this section that is, the academic or professional conception of philosophy. You should always bear in mind that the professional or academic understanding of philosophy is almost the opposite of that of the layman. Unlike the layman, the professional philosopher begins to define philosophy from its origin. According to academic philosophers, philosophy originated from the Ancient Greek City State of Miletus. This was around the late 5th and early 6th Century B.C. But you should also quickly remember that this Eurocentric view which limits the Origin of Philosophy to the Ancient Greeks has been criticised and rejected by some contemporary African philosophers. To some African philosophers such as Eboussi Boulaga, Marcien Towa, E. Njoh Mouelle and P.O. Bodunrin, philosophy also has an African origin. There existed early intellectual, scientific and philosophical activities in ancient Africa long before their European or Western counterparts began any meaningful philosophical inquiry. It is on record that Ionian Philosophers especially Pythagoras and Thales visited Africa notably ancient Egypt and “were educated in all disciplines of knowledge by African teachers” (I.C. Onyewuanyi, 1987:44). In the preface to *the African Origin of Greek Philosophy*, P.O Bodunrin says:

- It is impossible to think that the Greek or western Philosophers would not have been influenced by African thought (I.C Onyewuenyi, 1987:8).

According to Onyewuenyi, “what is called Greek Philosophy should be regarded as haven been stolen from Africa” (1987:8). Any one that claims that Greece is the only birth place of philosophy commits an unforgivable historical mistake. It is also an unfortunate deliberate attempt to discredit the achievement of the black people and a gross injustice to the contributions of African Philosophy.

“Love of Wisdom”

You should always bear in mind that despite the critic of Eurocentrism as aforementioned, ancient Greece remains the first place in Europe where philosophy was systematised as a discipline. Pythagoras was the first to make a standard comment about the nature and definition of philosophy. He was a Greek mystic, mathematician and philosopher. It is on record that “when he was called Wise man, he said that his wisdom only consisted in knowing that he was ignorant and that he should therefore not be called a wise man but a “lover of wisdom” (A.C. Ewing, 1951:9).

SELF ASSESSMENT EXERCISE 3

Use your own words to explain the different conceptions of Philosophy.

4.0 CONCLUSION

This study unit mainly dealt with the analysis and definitions of philosophy as the parent of all disciplines.

5.0 SUMMARY

In this unit, you have studied the analysis, understanding and definitions of philosophy. Also, you have learnt why philosophy can be regarded as the parent discipline, the relationship between philosophy and specialised sciences and the perennial character of philosophy.

6.0 TUTOR-MARKED ASSIGNMENT

1. Who is a philosopher?
2. Why is philosophy regarded as the parent discipline?

7.0 REFERENCES/FURTHER READING

Brush, G.S. (1973). "Physics: Philosophical Foundations". *Encyclopedia Americana*, Vol. 22. New York: Americana Corporation.

Copleston, F. (1962). *A History of Philosophy*. Vol. 1. New York: Image Books.

Konstantinous, F.V.; A. Bogamolov, *et.al.* (1982). *The Fundamentals of Marxist–Leninist Philosophy*. Moscow: Progress Publishers.

Passmore J. (1972). "Philosophy". *The Encyclopedia of Philosophy*, Vol. 6. New York: Macmillan and the Free Press.

Russell, B. (1945). *A History of Western Philosophy*. New York: Simon and Schuster.

UNIT 2 PHILOSOPHY AS THE PARENT DISCIPLINE

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Historical Background of Philosophy
 - 3.2 The Era of “Pregnancy”.
 - 3.3 The Era of “Delivery” and Settlement
 - 3.4 Does Philosophy Still Remain the Parent Discipline?
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the analysis of philosophy as the parent of all disciplines. It also x-rays the origin and development of philosophy. Special attention will be given to how other disciplines were born by and later emancipated from philosophy.

2.0 OBJECTIVES

At the end of the unit, you should be able to:

- identify how and why philosophy can be referred to as the parent discipline
- discuss the relationship between philosophy and the sciences
- demonstrate the perennial character of philosophy.

3.0 MAIN CONTENT

3.1 Historical Background of Philosophy

To the layman, when you say that philosophy is the parent of all disciplines, it sounds like a joke. To him it is absurd to see any relation between that abstract subject called philosophy and economics, physics, political science, etc. In order to know if this position is defensible, I believe that the historical background of philosophy is very necessary.

As already mentioned in Unit 1, it was curiosity and the desire for knowledge for its own sake, followed by a feeling of wonder that actually triggered off philosophy. It is on record that the first

philosophers especially the Ionians or Milesians were mainly concerned about the nature of the universe.

For instance, they were wondering about the constant process of change, of transition from day to night, from life to death and vice versa, etc. Thales of Miletus was the first to identify water as the “primary substance” of the universe. That is why even today, some scholars still address him as the “father of philosophy”. On the other hand, Anaximenes said the primary stuff was air, Anaximander said it was “the unlimited” or “the indeterminate boundless” and Heraclitus said it was fire. What you should always remember here is that the main purpose of all these Ionians was “to understand”, “to know” and it is on this that philosophy is grounded. And, this was the beginning of philosophic enterprise. At that particular period, there was no difference between philosophy and science or, as Bertrand Russell puts it, “Philosophy and science which were not originally separated – were therefore born together” (1945:3). Till today, the Ionian thinkers are best known as “Greek Philosopher Scientists”. For instance, Thales is credited with the prediction of the eclipse of 585 B.C. Anaximander is known to have made an ingenious guess as to the origin of man. He was the first to maintain that man was originally born from animals of another species.

Anaximenes is known to be the first scientist to explain the cause of rainbow. According to him, rainbow is the result of the sun’s ray falling on the thick cloud which they cannot penetrate. Always bear in mind that during the era of Ionian speculations, all knowledge was one. There was no difference between scientific procedures and magical procedures. In Coplestone’s word: “the early Ionian thinkers or wise men pursued all sorts of scientific consideration... and these were not clearly separated from philosophy.” (1962:32). That is why, even today, no serious astronomer, geographer, physicist, historian, etc can resist paying homage to Ionian philosophers.

SELF ASSESSMENT EXERCISE 1

What do you know about the Ionian Philosophers?

3.2 The Era of “Pregnancy”.

You should bear in mind that even after the Ionian thinkers, philosophy remained pregnant with science for a very long time. In fact, science is the oldest child of philosophy.

In Plato's and Aristotle's writings, for instance, it was difficult to differentiate the philosophical from the scientific. These two philosophers considered so many issues, some of which now belong to the special sciences. Aristotle is mostly known to have delved into almost all disciplines. He dealt with various subjects such as logic, Biology, Meta-Physics, Politics, Anatomy, and so on. It is on record that his writings were used as Encyclopaedia of philosophy in the Middle Ages because almost all the universities in that period considered philosophy as an all embracing discipline. This is one of the reasons why: "the highest degree awarded in the arts and sciences, regardless of the special field of concentration, still bears the title of "Doctor of Philosophy" (Lewis, 1973:770). You should always bear in mind that this was because most scientific learning until Galileo was largely speculative; therefore, it was easier for philosophy to contain them.

Even in modern period, philosophy is still seen as an encyclopedic discipline. All degrees, no matter the discipline, from Medicine, Law to Engineering, Pharmacy, Natural Sciences, Social Sciences, all end with Doctor of Philosophy, Ph.D.

SELF ASSESSMENT EXERCISE 2

Discuss the Pregnancy of Philosophy.

3.3 The Era of Delivery and Settlement

When the pregnancy of philosophy was due, the moment of delivery and settlement became unavoidable. Many disciplines that were still under philosophy broke away and decided to stay on their own. The 18th Century can be considered as the 'take off' of "delivery" and settlement. It is in this period that "natural philosophy" which later became "natural science" began to stand on its own. This split was the result of the orientation of some early Greek Philosopher-scientists such as Democritus, Epicurus, Leucippus, Lucretius and Pythagoras. You should always remember that "natural philosophy" later split into what today we call Chemistry, Physics, Biology, etc.

The 19th Century witnessed the breaking away and settlement of the social sciences from the parent discipline. You should know that it is tautological to say that the social sciences originated from Greek philosophers. You should also know that the birth of social sciences was a gradual process. Apart from the ancient Greek philosophers, the birth and settlement of the social sciences was hastened in the 19th Century by the works of some philosophers such as Malthus, Ricardo, Karl Marx, Auguste Comte, etc. You should always bear in mind that the

birth of the social sciences came along with some problems among social scientists themselves. They were two factions. The first faction championed the cause of a single social science while the second championed the diversity of the discipline. The second faction won the battle. Thus, Economics became the first to attain the status of single social science. The next was political science, followed by anthropology. Sociology and Psychology came much later.

SELF ASSESSMENT EXERCISE 3

Discuss the delivery and settlement process in philosophy.

3.4 Does Philosophy Still Remain the Parent Discipline?

The answer to this question is yes. However, this does not mean that all is well with philosophy. The breaking away of natural and social sciences from philosophy cannot be overlooked. Even today some critics' claim that in future other disciplines will also spring from philosophy, since some questions we now consider as philosophical will in future not be so regarded. It is in line with this claim that J.L Austin, for instance, maintained that Philosophy is at the verge of giving birth to a new type of linguistic theory. Nowadays, some philosophers, themselves, express the sentiment that even logic, which is one of the traditional branches of philosophy will soon break away because of its strong affinity to mathematics. But you should always bear in mind that despite all this, philosophy was, is, and remains the parent discipline. This is one of the reasons why Aristotle almost 3000 years ago, called it "the first and the last science".

According to Aristotle, philosophy is the "first science" because it is logically presupposed by every other science. It is also the "last science" because in order to understand it we must, to some extent, have mastered the other science (Passmore, 1972:219).

In Aristotle's view, all sciences share in philosophy. Therefore, it is the only discipline that is universal. Other special sciences concern themselves with a part of being or reality. It is the duty of a Philosopher to co-ordinate the fundamental principles of the various sciences. The philosopher identifies and offers solutions to certain problems of world outlook and methodology which all sciences share and which cannot be solved within the framework of specialised research (Konstantinou, 1982:16). In conclusion, you must always remember that no matter what, philosophy can be compared to Shakespeare's King Lear. It is on record that it was from Pythagoras that philosophy derived its origin and meaning. In academic circles, therefore, philosophy comes from two Greek words "Philo" meaning "love" and "Sophia" meaning "Wisdom".

Hence, etymologically philosophy means “love of wisdom”. In the *Oxford Advanced Learners Dictionary* for instance, the word “wise” literally means “having or showing experience, knowledge, good judgment, prudence etc “if you follow closely the *Oxford Dictionary*, it is implied that an individual can be knowledgeable but lack wisdom. Here wisdom simple means that the individual has certain qualities which some others do not have. However, in Pythagoras’ opinion, it is impossible for an individual to be wise but lack knowledge. The term wisdom goes beyond mere knowledge. The basic aim of philosophy is to “deal with pulsating problems of life”. That is why early Greek philosophers did philosophise primarily to satisfy their curiosity to know the origin of the objective reality such as the perplexing features and immensity of the natural world, the facts of man’s birth, growth, death and delay.

Wonder about Man and Wonder about the World

Always remember that the desire to know and to satisfy their curiosity led early Greek philosophers to begin to wonder about man and the world. According to them, all knowledge begins in wonder, doubt and curiosity. Thus when you wonder about man and the world you are philosophising. Aristotle emphasised that: “it is owing to their wonder that men now begin and first began to philosophise”.

Before Aristotle, Plato had already put it this way: “this sense of wonder is the mark of the Philosopher. Philosophy indeed has no other origin”. In line with this, it is obvious that philosophy is all-embracing. The entire universe is its scope and subject matter.

SELF ASSESSMENT EXERCISE 4

We are all philosophers. Discuss.

4.0 CONCLUSION

This study unit dealt with the definition and scope of philosophy. It dealt specifically with the various definitions and interpretations of philosophy.

5.0 SUMMARY

In this study unit, you were introduced to the definition and scope of philosophy as a discipline. You learnt to define Philosophy, discuss the complex nature of philosophy, differentiate between popular and professional conceptions of philosophy and discuss the origin of philosophy.

6.0 TUTOR-MARKED ASSIGNMENT

We are all philosophers. Discuss.

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UNIT 3 BRANCHES OF PHILOSOPHY

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Logic
 - 3.2 Metaphysics
 - 3.3 Epistemology
 - 3.4 Ethics
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the major branches of philosophy. It is an opportunity for you to know the divisions and sub-divisions within philosophy.

2.0 OBJECTIVES

The main purpose of this unit is to inform you about the main divisions of philosophy. At the end of this unit, you should be able to:

- list the major branches of Philosophy
- define and discuss logic
- define and discuss Metaphysics
- define and discuss Epistemology
- define and discuss Ethics.

3.0 MAIN CONTENT

3.1 Logic

You should always remember that whenever a question such as what is logic is asked, no straight forward answer can be given. Logic has been variously defined by different scholars. Copi for instance, defines logic “as the study of the methods and principles used in distinguishing good (correct) from bad (incorrect) reasoning” (1972). On the other hand, Nancy sees logic “as the science that appraises reasoning as correct or incorrect” (1990:34). Kahane on his part defines logic as “an attempt to distinguish between correct (valid) and incorrect (invalid) arguments” (1968:2). Logic can also be defined as the science of good

or bad reasoning. Etymologically, logic as a discipline derives from the Greek word *logos*, which means study, word or discourse. Basically, you can notice that in all definitions, the main concepts which stand out clearly are reasoning and argumentation. Therefore, we can say that logic is the study of the criteria of differentiating correct from incorrect arguments. The logician is most concerned with argument which is a group of propositions whose function is to make a claim about something. Always remember that any argument must have premises and conclusion. And the conclusion of any argument must follow or be inferred from the premises. For example:

- P₁ If you do not attend logic class, you will fail
- P₂ You have not attended logic class
- C therefore you will fail

Arguments are either “Deductive” or “Inductive”. In logic, an argument is deductive when the conclusion follows from its premises with absolute necessity or certainty. Deduction is the process of moving from the general to the specific. In other words, in logic we deduce when we move from a proposition describing a condition that holds in all instances to a particular instance. For example:

- P₁ All men are mortal
- P₂ Socrates is a man
- C therefore Socrates is mortal.

However, inductive arguments are those in which the premises do not lead to the conclusion with certainty. Induction is based on “probability”. For instance, when you say Peter is drunk most of the time. Today he will be drunk as well. Here most of the time, does not entail all the time. Therefore, one cannot conclude with certainty that Peter will be drunk today. You can see that there is no necessity in this conclusion. Probability is what characterises it.

SELF ASSESSMENT EXERCISE 1

In your own words, define and discuss logic.

3.2 Metaphysics

Unlike logic, metaphysics is the study of the “first principle” or ultimate reality. It is also called the theory of being. It is the only science that deals with the study of the basic and fundamental issues of the universe. According to Aristotle, all other disciplines study “aspects of reality or being, but none of them concerns itself with the study of being as

such” (Mann, 1966:18). However, there must be a science of being, “a science of the first things or of the most real” (Mann, 1966:16).

Indeed, the science of being would be the most basic for in a sense all other special sciences presupposed it” (Mann, 1966:16). That science according to Aristotle is *Metaphysics*. In his view, metaphysics studies the totality of things in the universe both the possible and the real, the visible and the invisible. *Metaphysics* is a general study of existence and reality.

Andronicus is credited with the coining of the word “metaphysics”. History tells us that the word “*Metaphysics* was actually an editorial mistake. It is on record that several decades after Aristotle’s death Andronicus decided to sort through his works and gave them titles. Aristotle wrote a series of books dealing with nature which he himself called “the physics”. When Andronicus reached the batch of writings that followed “the physics” he did not know what to call them, so he invented a word “metaphysics” Etymologically, the word metaphysics came from two Greek words META which means “after” and PHYSIKA which means “Physics” or “nature”. So the Greek word METAPHYSIKA means “after the things of nature or after physics.

You should also bear in mind that even if Aristotle is considered as the founding father of metaphysics as a science of reality he was not the first to raise metaphysical problems. *Metaphysics* as an intellectual enterprise dates back to the pre-Socratic philosophers such as Thales, Anaximander, Anaximenes as well as Pythagoras, Parmenides and Heraclitus. The concern of these philosophers was the search for the primary stuff of the universe. They were also concerned with determining the ultimate constitutive elements and grounds for the unity of things. *Metaphysics* deals with questions such as: what is reality? Why something instead of nothing? Is reality one or many.” Is the universe self-caused or does it involve the concept of a creator?

What is the transcendent origin and foundation of this existence? Is reality essentially spiritual or material? Do persons have minds distinct from their bodies? What is mind? Is it a series of experiences? What is matter? Which is primary? What are their relationships? Are men free? Does God exist? What is the divine?

If you look deep into these questions, you will discover that the answers lie beyond the boundaries of our experience. This simply means that the criterion for settling such question is not empirical possibility, but freedom from logical contradiction.

SELF ASSESSMENT EXERCISE 2

In your own words define and discuss Metaphysics.

3.3 Epistemology

Epistemology is one of the most important branches of philosophy. Etymologically, it derives from two Greek words “Episteme” which means “knowledge” and “logos” which means “study, discourse or reasoning”. Epistemology is best known as the branch of critical philosophy which consists in investigating the scope, source and limitations of human knowledge. Epistemology tries to discover what knowledge is and how it differs from mere opinion or belief. That is why it is also called theory of knowledge. According to Aristotle, “every man wants to know,” and this is very relevant to man’s life. As a discipline, it deals with questions such as: What is the nature of human knowledge? What is the relation between knowledge and belief? What makes some beliefs true and others false? Is the human mind capable of knowing? Can we know anything with certainty or must we be satisfied with mere guesses and opinions? How are we to define truth? How do you know that the physical world exists? What is the relation between knowledge and reality? Does all knowledge of the real world arise out of experience or do we have knowledge that is in some degree independent of experience? If all knowledge does arise out of experience and if experience can give us some degree of probability, how is it possible to achieve the absolute certainty that we claim to have achieved in the realms of logic and mathematics?

SELF ASSESSMENT EXERCISE 3

In your own words define and discuss Epistemology.

3.4 Ethics

Ethics is mostly known as “the branch of philosophy which deals with the morality of human actions in society” (Omogbe, 1989:2). Etymologically, ethics comes from the Greek word “Ethos” which means “custom” or “character”. Sometimes it is called “moral philosophy”. And you should always remember that Socrates was the first to systematise the discipline. He was the first to claim that “the unexamined life is not worth living”. Socrates devoted all his life to a critical examination of human behaviour. He was the first to confess that “the only thing I know is that I know nothing”. In his opinion, ethics is also referred to as the science of human conduct”. The subject matter of ethics is human conduct and precisely those actions which we perform consciously and willfully. The major business of ethics is to compare

what you do and what you ought to do. Ethics is not primarily concerned with facts or the “is”, but rather with the “ought”. In other words, ethics is not interested in the ontic but in the ontological question. Thus, the focus on the “ought” as primary mission is what differentiates ethics from other disciplines. You should also know that ethics is divided into **descriptive**, **prescriptive** or **normative**, and **meta-ethics**.

***Descriptive Ethics**

The duty of descriptive ethics is to examine the moral views held by men or the society and to confirm whether these views are universal or not. In Udoiridem’s words:

- The study of human actions centres on the description of ... How human beings behave or act without actually making value judgments or prescribing what human beings should or should not do (1992:70).

***Normative or Prescriptive Ethics**

The main duty of normative ethics is to prescribe what ought to be both for humans and society. In other words, it prescribes that criteria for human actions properly be judged as morally good or bad.

***Meta-Ethics**

It is the part of ethics that deals with the logic and language of ethical concepts and terms. In other words, meta-ethics is mostly concerned with the elucidation or description of the precise meaning of the key terms of moral appraisal such as “good”, “bad”, “right” “wrong”, “ought”, etc. In this sense, meta-ethics is morally descriptive. For instance “God is good”. In this sentence the term “good” simply describe how God is.

As a normative discipline, ethics deals with questions such as: How do men ought to behave? What is morality? What is the nature of moral responsibility? What is the definition of good? What is the chief goal for which all men should strive? Is it accumulation of wealth or is it pleasure or happiness? Has man any final end? Is there any real difference between morally right and wrong actions? Or is it merely a matter of feeling? What is the role of punishment? Are moral judgments on what we ought to do objective or subjective or are they arbitrary?

SELF ASSESSMENT EXERCISE 4

In your own words, define and discuss ethics.

4.0 CONCLUSION

This study unit dealt with the major branches of philosophy and their characteristics.

5.0 SUMMARY

This study unit introduced you to the definition and characteristics of the major branches of philosophy, the definitions and explanations on logic, meta-physics, epistemology and ethics.

6.0 TUTOR-MARKED ASSIGNMENT

State and discuss the major branches of philosophy.

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UNIT 4 PHILOSOPHY AND OTHER DISCIPLINES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Philosophy and Science
 - 3.2 Philosophy and Religion
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the analysis of the relationship between philosophy and other disciplines. Bearing in mind that there is no discipline *per se* that does not stem from philosophy as parent discipline (Unit 3), my main focus in this unit will be specifically on the relationship between philosophy, the sciences and religion.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- discuss the point of convergence and divergence between philosophy and science
- explain the point of convergence and divergence between philosophy and religion
- define and discuss the subject matter of philosophy, science and religion.

3.0 MAIN CONTENT

3.1 Philosophy and Science

You should bear in mind that until late 16th and early 19th Centuries all scientific knowledge was within the ambit of philosophical inquiry. In other words, philosophy was the “science” per excellence. But according to Archie J. Bahm:

- As reflections upon problems became increasing, complex and as special techniques were developed, specialists limited the range of these inquiries, and the particular sciences were born. Among the first were mechanics, mathematics and astronomy. Among the latest

were psychology and sociology. The romance of the maturing of these offspring of the fecund mother must be left to the history of science (1995:10).

The Nature of Scientific Knowledge

Unlike philosophy, science is best known as “an exact discipline”. In line with this, *The Oxford Advanced Dictionary* also defines science as “knowledge arranged in an orderly manner, especially knowledge obtained by observation and testing of facts....” For Frolov, the nature of scientific knowledge goes beyond this “positivist” definition. According to him, science is also “the field of research directed towards obtaining further knowledge of nature, society and thought”... It (science) is not limited to natural or exact sciences. Science is an integral system with its components flexibly correlated in history, study of nature, study of society, natural science (1984:372).

There is no doubt that science stemmed from philosophy. It is also true that as a discipline, science bears some specific characteristics different from philosophy. According to Harold H. Titus, scientific knowledge can be defined as:

- A system of man’s understanding of nature, society and thought. It reflects the world in concepts, categories and laws whose truth is verified by practical experience. Science is the study of the totality of the concrete spheres of material reality. It is concerned to investigate and establish objective laws of nature by forming working hypothesis by which man may be enabled to harness nature to his purposes and transform his environment (1997:65).

From the above definition of science, it should be clear to you that the main purpose of science as discipline is to observe, understand natural phenomena and then control processes. To any scientist, it is assumed that the universe, the orderly and natural phenomena are predictable and lawful.

Convergences and Divergences between Philosophy and Science

Always remember that it is improper to consider philosophy and science as competitors. Even though science originated from philosophy as a discipline their subject matter is different. The scientist main business is to explain natural phenomena, while a philosopher does not intend to do so. An average scientist always seeks for explanation while the philosopher basically seeks for justification. You should also know that the two main scientific purposes are prediction and control over phenomena. There are also six steps procedures in any scientific inquiry

which one cannot avoid. These are: **observation, inductive generalisation, hypothesis, attempted verification of hypothesis, proof or disproof and knowledge.** Thus prediction and control based on the laws of induction are what makes science not only original but also different from philosophy. As academic disciplines, their methodologies are quite different.

The philosopher's inquiry begins where that of the scientist stops. It may be difficult for a scientist to answer philosophical questions. Philosophy operates at a different level. A scientist cannot answer philosophical questions such as: is the world divided into mind and matter or is it possessed of independent power? Is the mind subject to matter or is it possessed of independent power? Has the universe any unity or purpose? Is it evolving towards some goal? Are there really laws of nature or do we believe in them only because of our innate love of order? Does God exist? You can see that none of these questions can find answer in the scientist's laboratory. You should also bear in mind that even though the kind of knowledge that the scientist and philosopher seek is different, the purpose of their disciplines is often similar because both of them are motivated by sheer curiosity and the satisfaction of having knowledge of the universe purely for the pleasure of the understanding.

SELF ASSESSMENT EXERCISE 1

Define and discuss the relationship between philosophy and science.

3.2 Philosophy and Religion

The purposes of philosophy and religion are fundamentally opposed. A philosopher is always critical while a religionist is not. For a religionist, the role of reason is basically one of interpreting and defending the dogma derived from sources whose authority and truth is taken on faith while any serious philosopher begins his investigations from a position of intellectual neutrality regardless of where his personal sympathies may lie. In philosophy, any known assumption is subject to critical scrutiny while religion is purely dogmatic. In religion knowledge is sought principally as a means to achieve what a given religion takes to be human kind's final happiness or destiny. While in philosophy, knowledge is sought simply for its own sake. Philosophy often questions the assumptions of religion.

You should also know that the purposes of philosophy should not be confused with those of the religious minister, the theologians, the psycho-analyst, pastors and imams. A philosopher is not a magician. Critical reasoning, neutrality and the desire for knowledge for its own

sake are the basic concerns of a philosopher. It is in this sense that philosophy is very different from religion.

SELF ASSESSMENT EXERCISE 2

Define and discuss the relationship between philosophy and religion.

4.0 CONCLUSION

This study unit dealt with the relationship between philosophy and other disciplines. It focused specifically on the relationship between philosophy, science and religion.

5.0 SUMMARY

This study unit introduced you to the relationship between philosophy, science and religion, the convergence and divergence between philosophy and religion and the definition and explanation of the subject matter of philosophy, science and religion.

6.0 TUTOR-MARKED ASSIGNMENT

Define and discuss the relationship between philosophy, science and religion.

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UNIT 5 SOURCES OF KNOWLEDGE AND CRITERIA FOR KNOWING

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Difference between Knowledge, Opinion and Belief
 - 3.2 Commonsense Understanding of Knowledge, Opinion and Belief
 - 3.3 Philosophical Understanding of Knowledge, Opinion and Belief
 - 3.4 Sources of Knowledge
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading
- 1.0 INTRODUCTION**

This study unit introduces you to the different sources and criteria for knowing. It is an opportunity for you to differentiate between common sense and philosophical understanding of knowledge, belief and opinion. The different sources of knowledge will be emphasised.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- differentiate between knowledge, opinion and belief
- discuss the common sense and philosophical understanding of knowledge
- differentiate opinion and belief
- identify the different sources of knowledge
- discuss the criteria for knowledge.

3.0 MAIN CONTENT

3.1 Difference between Knowledge, Opinion and Belief

In ordinary language it seems there is no difference, at all, between knowledge, opinion and belief. Often times, they are used interchangeably. In the daily life, it is easy for someone to say he “knows” when he should say he “believes”. On the other hand he “believes” when he should say he “knows”. You should always remember that the question of knowledge is not an easy one. It is not

easy to align our thoughts with reality. Our mind is always puzzled when it comes to adjusting our beliefs to the knowledge of things in the world, so that our beliefs become grounded in evidence. Therefore, the relationship and the difference between knowledge, opinion and belief depend on the person's position.

3.2 Commonsense Understanding of Knowledge, Opinion and Belief

As stated earlier, often times knowledge, opinion and belief are used interchangeably. This confusion mostly appears in common sense usage. To a layman knowledge implies many things. For instance, knowledge can even be synonymous with acquaintance. When a layman asks a question such as: "Do you know the Vice – Chancellor of the National Open University of Nigeria?" In his mind this question is the same as "are you acquainted with the Vice-Chancellor?" However, the truth is that you might know the Vice-Chancellor in the sense of being acquainted with him without knowing much about him. On the other hand, it is also possible to know a great deal about some other person which you have never met. For instance as a student of philosophy, you know a great deal about Plato but I am sure that you never met him.

Also, in daily life, some people say they "know" while they mean "believe" or "think"; for instance, when a layman says that a particular medicine is good. What he has in mind is "think" because he might have some authoritative persons saying it that that medicine is good. Most of the time we hear people saying that they "know" that Black men are cursed; nothing good can come out of them. They "know" that things will never work well for them. It is clear that in the above statements there is an obvious confusion between knowledge, opinion and belief. And, this is what happens in the daily life of a layman.

SELF ASSESSMENT EXERCISE 1

Discuss the commonsense understanding of knowledge, opinion or belief.

3.3 Philosophical Understanding of Knowledge, Opinion and Belief

The philosophical understanding of knowledge is very different from that of the layman. For a layman, knowledge, opinion and belief are interwoven. But it is not possible in philosophy. For a philosopher, you say "know" when you possess information that is beyond doubt. Philosophical knowledge follows the logic of proposition. i.e. "I know that..." for example, "I know that Nigeria is the most populated country

in Africa”. “I know that Cameroon and Nigeria are neighbours”. According to John Hospers, if we take the letter “X” to stand for any proposition, some requirements must be met in order for us to assert, truly that we know “X”:

- “X” must be true”,
- “We must have evidence for ‘X’, that is, reason to believe ‘X’,
- “Not only must ‘X’ be true, we must believe that ‘X’ is true”,
- “There must be no counter – evidence”.

Hospers adds that:

- The moment you have some reasons to believe that a proposition is not true, this immediately negates a person’s claim to know it. You cannot know ‘X’ if X is not true. If I say I know ‘X’, but ‘X’ is not true, my statement is self – contradicting for part of what is involved in knowing ‘X’ is that ‘X’ is true (1956:144).

According to him, “there may be numerous statements that you believe but do not know to be true, but there can be none, which you know to be true but don’t believe... for believing is a defining characteristic of knowing. But believing ‘X’ is not a defining characteristic of ‘X’ being true. ‘X’ can be true even though neither he nor I nor anyone believes it. After all, the earth was round even before anyone believed that it was (1956:145).

What matters here are that knowledge implies being sure, being certain. Also believing can be seen as a pre-condition for knowledge. Because when you know something, you have a right to a certain confidence in your belief as a true and reliable guide to action.

Thus, you cannot say you know something which you are not sure of. But it is possible to believe something you are not sure of. You can believe in the existence of God, yet you are not sure of his existence. There is no problem in a statement such as “I think that God exists but I am not sure”. But you can say for instance that “I know he will come but I am not sure”. Knowledge is more qualitative than opinion and belief. An opinion or belief cannot be true unless it is grounded or supported with evidence. Evidence is the unique characteristic of knowledge.

That is why customs and some hereditary matters are always at odds with knowledge. You should know that it is not because some customs, beliefs or hereditary affairs are unquestionable that they are synonymous with knowledge. Some unquestionable beliefs are not well founded or grounded in evidence. Therefore, they do not constitute knowledge. Always remember that the knower must not only be able to adduce

sufficient evidence but must also know that he knows his beliefs; for to know is to know that you know. It must be clear to you now that knowledge is quite different from opinion or belief. We have knowledge only when we can provide reasons and evidence for our claims. On the contrary, belief or opinion is based on inner, personal certainty and conviction. Knowledge is objective i.e. it must be communicable and verifiable.

SELF ASSESSMENT EXERCISE 2

Discuss the philosophical understanding of knowledge, opinion and belief.

3.4 Sources of Knowledge

One of the perennial questions in the history of philosophy has always been this: How does knowledge come about? How do we know propositions to be true? Or by what means do we come by our knowledge of the real world? Answers to these questions have been given through the following means:

- (a) Reason
- (b) Sense experience
- (c) Authority
- (d) Intuition
- (e) Revelation/faith and

- **Reason**

Rationalism is the theory which believes that human beings can acquire knowledge of reality by the use of our minds alone, by thinking or pure reason. To any rationalist, reason is a necessary ingredient for all our knowledge claims. This is one of the reasons why Aristotle defines man as “a rational animal”. Thus, the ability to think is what is called reason.

Any serious rationalist agrees that we cannot acquire knowledge through sense experience without the powers of reason. For them, it is true that our perceptual experience provides the raw material for judgments, but without reason, we cannot make judgments at all.

For instance, to reason that the object in front of you is a blackboard you must first of all recognise it as a blackboard based on certain perceptual characteristics such as colour, smell, taste, size, shape as they recur in your experience.

Then, by way of abstraction, you are able to recognize a blackboard when there is a combination of these characteristics. To the rationalist

therefore "... reason is the prima-matrix of human knowledge and with it alone the certainty of human knowledge is guaranteed" (Ayer, 1956:54).

- **Sense Experience**

Sense experience is another source of knowledge. Empiricists are the proponents of sense experience theory. To any empiricist, as far as knowledge is concerned, only sense experience matters. In other words, empiricism is the philosophical theory which denies reason while insisting that experience is always the necessary ingredient in our knowledge claims of the natural world.

- **Authority**

Authority is also considered as one of the sources of knowledge. Authority as source of knowledge occurs when we make certain claims to knowledge based on the authority of someone who is a specialist in the particular field of knowledge. "*Magister dixit*" i.e. the '*Master said*'. For instance, I know it is true because Dr. Ngamen Kouassi said so. Here, Dr. Ngamen Kouassi becomes an authority on the subject. But you should always remember that even as a source of knowledge, authority is a relative term. A man may be an authority in a certain field of knowledge like Dr. Ngamen Kouassi, in philosophy but not in psychology even if he claims some knowledge of it. It is fallacious reasoning to ascribe authority to someone who is not a specialist in a particular field of knowledge.

- **Intuition**

Another source of knowledge is intuition; Balm defines intuition as the "immediacy of apprehension" (1995:5). According to him:

- ... Intuition is the name we give to the way awareness apprehends when awareness apprehends appearance directly. No intuiting exists apart from awareness; no awareness exists without intuiting (1995:5).

That is why you sometimes hear people say: "I have a sense of intuition". "I know by intuition that Dr. Ngamen Kouassi will be here soon.

- **Revelation and Faith**

These are also considered as sources of knowledge. It is common to hear people: “it was revealed to me in a dream” or “it was revealed to me by God and I have faith in it”. “My faith guides me in this matter and I know that it is certainly true”.

SELF ASSESSMENT EXERCISE 3

Define and discuss the different sources of knowledge.

4.0 CONCLUSION

This study unit dealt with different sources of knowledge and their criteria for knowing. It also emphasised on the common sense and philosophical understanding of knowledge, belief and opinion.

5.0 SUMMARY

In this study unit, you were introduced to the different sources and criteria for knowing. You learnt to be able to:

- differentiate between knowledge, opinion and belief, and
 - define and discuss the common sense and philosophical understanding of knowledge, belief and opinion.
- You also learnt to identify the different sources of knowledge and how to discuss the criteria for knowing.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the similarities and dissimilarities between knowledge, belief and opinion.

7.0 REFERENCES/FURTHER READING

Ayer, A.J. (1995). *The Problems of Knowledge*. London: Penguin Books.

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MODULE 2

INTRODUCTION

This second module is made up of five study units. It is a great opportunity for you to know about the definition and scope of logic (Unit 1). This module will also teach you some basic concepts in logic such as statement/proposition, premise, inference, conclusion, valid/invalid argument, predicate, major, minor and middle term (Units 2 and 3). The fourth unit will teach you how to define inductive and deductive argument; how a deductive argument can be said to be valid or invalid, sound or unsound, and, how an inductive argument can be said to be weak or strong. The fifth and last unit will define language and state some of its functions.

Unit 1	Definition and Scope of Logic
Unit 2	Logic's Vocabulary I
Unit 3	Logic's Vocabulary II
Unit 4	Valid, Invalid, Deductive and Inductive Arguments
Unit 5	Language and its Functions

UNIT 1 DEFINITION AND SCOPE OF LOGIC

CONTENTS

1.0	Introduction
2.0	Objectives
4.0	Main Content
	4.1 Definition of Logic
	4.2 Logical Processes
	4.3 Why Study Logic?
	4.4 Logic and Other Disciplines
	4.5 Classification of Logic
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

Introduction to logic and critical thinking is a very exciting and interesting study. Although it will require more effort from you, it remains nevertheless the best channel that will help you to learn how to reason better. Thus, through the study of this course, you will learn strategies for thinking well, common errors in reasoning to avoid, and effective techniques for evaluating arguments.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain what logic as a discipline actually means
- explain the different kinds of argument that exist
- describe the relationship between logic and other disciplines
- discuss the usefulness of logic as science, and
- identify about who the logician is and what he does.

3.0 MAIN CONTENT

3.1 Definition of Logic

Unlike philosophy itself, logicians seem to agree on what logic means or what it is about. Logic has been variously defined by different scholars. For instance, Copi defines logic as the study of the methods and principles used in distinguishing good (correct) from bad /incorrect reasoning (1972). On the other hand, Nancy sees logic “as the science that appraises reasoning as correct or incorrect” (1990:3.4). Kahane on his part defines logic as “an attempt to distinguish between correct (valid) from incorrect (invalid) arguments” (1968:2).

Etymologically, logic is derived from Greek word *Logos*, which means study, word or discourse. Basically, you can notice that in the above definitions the words which stand out clearly are reasoning and argumentation. Therefore, we can say that the study of logic is the study of correct and incorrect reasoning and arguments.

SELF ASSESSMENT EXERCISE 1

In your own words, define logic.

3.2 Logical Processes

Simple apprehension, judgment, reasoning and argument constitute what we call logical processes.

Simple Apprehension

Simple apprehension is the act by which the mind forms the concept of something without affirming or denying anything about it. For instance, if I say “look at that ship” and stop there. This is a simple apprehension because I have not said anything about the ship. I have neither affirmed nor denied anything about the ship. Some philosophers and logicians have denied the possibility of a simple apprehension. According to them, there is nothing like simple apprehension.

Judgment

In logic, judgment is known as the act by which the mind affirms or denies something of something else. For instance, if I proceed to say “look, that ship is big” then I have made a judgment by affirming the “bigness” of the ship.

Reasoning and Argument

Reasoning and argument constitutes the third and last stages of any logical process. It is also known as the act by which the mind passes from one, two or more judgments to a further judgment distinct from the preceding ones but implicitly contained in them. Besides simple apprehension and judgment, logic is strictly concerned with reasoning and argument.

SELF ASSESSMENT EXERCISE 2

Discuss the relationship between simple apprehension, judgment and reasoning and argument.

3.3 Why Study Logic?

It is very important to study logic because it is the only discipline that strictly lays down the rules which the mind must follow in order to arrive at truth and thereby minimise error. In other words, logic is the only discipline that teaches us how to formulate different types of arguments. As a discipline it will also equip you with the skills needed for effective and forceful presentation of your views in an argument. Logic is sometimes perceived by its critics as a subject that has no practical use. This is not true. The abstractness of logic does not make it irrelevant at all. Indeed, it is not contradictory to say that logic is to life what oxygen is to life. We all need logic in one way or the other, in one form or another. We all need logic to communicate and interact in the society. Even to be illogical presupposes a logical action or decision.

SELF ASSESSMENT EXERCISE 3

State some reasons why we should study logic.

3.4 Logic and Other Disciplines

Logic is part of philosophy. It is an important area of philosophy. There is no way you can determine correct or incorrect reasoning without

constructing arguments. And logic, being the discipline that draws the boundary between correct or incorrect reasoning, is very essential to philosophy. Therefore, it is not even an exaggeration to claim that logic is to philosophy what mathematics is to the sciences. Logic is even at the background of mathematics.

Apart from philosophy, logic is important to other disciplines as well. Any good sociologist, historian, lawyer, politician, physician and so on, requires the services of logic like philosophy. So long as there is reason for arguments, classification and ordering of things, logic is always needed. As earlier stated, it is only logic that can bring light, the general laws and cannons to which reason must conform.

Otakpor passionately terms logic as the “Queen of all disciplines” (1985:85-98). To him, it is obvious that “no scientist, historian, lawyer, engineer, etc. can afford to present his/her work in a disorderly manner and expect to be taken seriously because to be logical means to be orderly” (2000:5).

SELF ASSESSMENT EXERCISE 4

In your own words, discuss the relationship between logic and other disciplines.

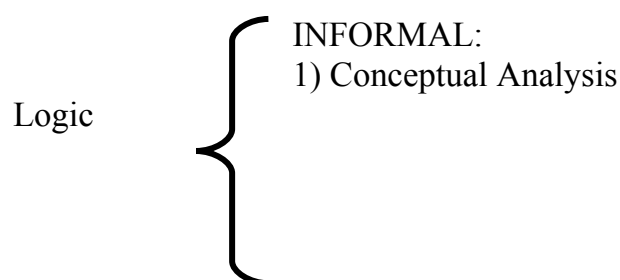
3.5 Classification of Logic

Traditionally, logic is divided into two main branches namely **formal** and **informal** logic.

Formal Logic

Formal Logic is the domain proper, general methodology and meta-logic. Logic proper is here understood as “the science of the laws on the basis of which from something given something else follows in untrue of the given” (Otakpor 2000:11). Logic proper is in turn subdivided into the following:

Logic of propositions, logic of terms i.e. predicates and classes and logic of relations.



FORMAL:

- 1) Methodology
- 2) Meta logic
- 3) Logic proper
 - (a) Logic of propositions
 - (b) Predicate logic
 - (c) Logic of terms
 - (d) Logic of class
 - (e) Logic of relations

SELF ASSESSMENT EXERCISE 5

What are the divisions of logic?

4.0 CONCLUSION

This study dealt with the definition and scope of logic. It dealt also with the classification of logic and the relationship between logic and other disciplines etc.

5.0 SUMMARY

In this unit, you have learnt the definition of logic and its scope, different divisions of logic, relationship between logic and other disciplines, usefulness of logic as a discipline and who a logician is and what he does.

6.0 TUTOR-MARKED ASSIGNMENT

We are all logicians. Discuss.

7.0 REFERENCES/FURTHER READING

Copi, I. M. (1968). *Introduction to Logic*. London: Macmillan.

Kahane, Howard. (1968). *Logic and Philosophy*. California: Wadsworth.

O' Connor, D.J. and B. Powell. (1980). *Elementary Logic*. London: Hodder.

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UNIT 2 LOGIC'S VOCABULARY I**CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 4.0 Main Content
 - 4.1 Statement or Proposition
 - 4.2 Premise
 - 4.3 Conclusion
 - 4.4 Inference
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to some basic concepts that logicians use. The unit will focus particularly on statement, proposition, premise, conclusion and inference.

2.0 OBJECTIVES

At the end of the unit, you should be able to:

- state with clarity what a statement or proposition actually means
- differentiate between statement and sentence
- describe with example what is a premise
- identify what is conclusion to a logician
- discuss with example what is inference.

4.0 MAIN CONTENT

3.1 Statement and Proposition

There is no difference between a statement and a proposition in logic. The two terms are synonymous and therefore interchangeable. However, logicians differentiate between statement and sentence. To them, even though the two terms are interwoven, they are not actually the same.

For instance, in everyday English, a sentence is a set of words expressing a statement, a question or a command. Thus whenever a sentence expresses a statement without question or command it can also be called logical statement. It should also be clear to you that in ordinary English, every logical statement is a sentence. But as stated earlier, not every sentence is a logical statement. It is only when a sentence can both be denied and asserted that it is qualified as logical statement or proposition. For example, the sentence “Nigeria is rich” can be asserted as follows:

- Yes Nigeria is rich.

It can also be denied by stating as follows:

- No, Nigeria is not rich.

Thus the sentence “Nigeria is rich” because it can be asserted and can also be denied, is a logical statement or proposition. Any sentence expressing questions, commands etc does not qualify as logical statement or proposition.

SELF ASSESSMENT EXERCISE 1

Which of the following are sentences? Which are statements?

- 1) The sky is blue
- 2) Murder is wrong
- 3) Either humans evolved from apes, or apes evolved from humans.
- 4) If seven is greater than six, then six is greater than seven.
- 5) “Stand at attention!” Ordered General Bradley
- 6) Trees or
- 7) It is not the case that Ben Franklin.

3.2 Premise

Premise is also one of the basic concepts in logic. It is known as evidence or conclusion. Basically, a premise refers to that proposition or statement, within an argument, which provides support for or grounds for asserting the conclusion of that argument. (Meneye Eze, 2003:18). In a valid argument, the premises imply the conclusion.

Premise and conclusion are relative terms. Conclusion does not necessarily mean the last sentence. The premise in an argument A can be the conclusion in argument B and vice-versa.

For example: All men are mortal
Abiola is a man
Therefore Abiola is a mortal.

In this example, the first two statements or prepositions are the premises while the last one is the conclusion.

Premise - Indicators

These are words and expression that indicate the premises within an argument. The following are some of the premise indicators. “since”, “for”, “as”, “because”, “in as much as”, “for the reason that” etc... When a statement follows the word “since” that statement is a premise. For example, “since the Vice- Chancellor is in school, there will be light today”, in any argument, the statement or proposition that comes after the word “because” is usually a premise for instance: There will be light today because the vice-chancellor is in school. Whenever the word “for” is used, it simply means that the sentence following it is the premise of the above argument. For example: there will be light today for the Vice-Chancellor is in school.

SELF ASSESSMENT EXERCISE 2

Define a premise and state some premise indicators.

3.3 Conclusion

In logic, conclusion is that proposition, within the argument, that is arrived at on the strength or basis of the information provided by the premises. Simply put, conclusion means to come or brings to an end. You should always remember that in any valid argument, the conclusion follows from the premises. For instance,

All philosophy students are wise
Aina is a philosophy student
Therefore Aina is wise

Here, it is clear that the third proposition “Aina is wise”, which is the conclusion of the argument, is arrived at on the basis of the information provided by the first two propositions, which are the premises.

Conclusion – indicators

There are some expressions and words that function to indicate the conclusion within a passage. These are generally called CONCLUSION – INDICATORS. For example: “hence”, “consequently”, “therefore”, “we may conclude”, “we may infer”, “thus”, “so” etc. whenever any of these words begins a statement or proposition, it is obvious that such proposition is a conclusion.

SELF ASSESSMENT EXERCISE 3

Define conclusion and state some conclusion–indicators.

3.4 Inference

In logic, to infer means to derive the conclusion of an argument from the premises of that argument. For example:

- All Camerounians are strong
- Song is a Camerounian
- Therefore, Song is strong

Here you can see that the conclusion “Song is strong” is derived from the first and second premises of the argument. This process of derivation is called inference.

SELF ASSESSMENT EXERCISE 4

Explain with an example what inference in logic is.

5.0 CONCLUSION

This study unit dealt with the definition and understanding of some basic concepts logicians use. It also discussed the difference between statement/proposition and sentence.

5.0 SUMMARY

This study unit introduced you to some basic concepts in logic. You have learnt what statement or proposition actually means in logic, the difference between a statement and sentence, definition of premise in logical terms, what conclusion is and how to discuss with example what inference is.

6.0 TUTOR-MARKED ASSIGNMENT

State with example some concepts logic cannot do without.

7.0 REFERENCES/FURTHER READING

Layman, C. Stephen. (2002). *The Power of Logic*, (2nd ed.). New York: McGraw-Hill.

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UNIT 3 LOGIC'S VOCABULARY II

CONTENTS

1.0 Introduction

- 2.0 Objectives
- 4.0 Main Content
 - 4.1 Argument
 - 4.2 Valid and Invalid Argument
 - 4.3 Subject or Predicate Term
 - 4.4 Major, Minor and Middle Terms
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit is the continuation of the preceding one (unit 2). It intends to introduce you to some basic concepts logicians use. But it focuses particularly on the definition, validity and invalidity of an argument; the subject or predicate term and major, minor and middle terms.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define argument
- differentiate between valid and invalid arguments
- define what a logician means by subject or predicate term
- differentiate between major, minor and middle terms.

3.0 MAIN CONTENT

3.1 Argument

An argument is a group of propositions, one of which, called the conclusion, is affirmed on the basis of the others, which are called premises. An argument is always the smallest unit of argumentation. At least two propositions or statements form an argument otherwise it is not argument. But not all the statements are arguments. Some non argumentative uses of statements such as in reports, illustration, explanatory statements, conditional statement, etc...are sometimes confused with arguments. As earlier stated, at least two statements or propositions form an argument. In the case of two propositions, only one must be the premise while the other must be the conclusion.

For instance: “As soon as Dr Ofotokun comes, he marks his scripts.” Here, the conclusion is “he marks his scripts” while the premise is “Dr. Ofotokun comes”. The expression “as soon as” stands as premise –

indicator. When more than two propositions or statements form an argument, one must be a conclusion while the others must be premises. Example:

- All mothers are caring
- Carine Ngamen is a mother
- Therefore, Carine Ngamen is caring

You should always remember that no matter how many premises form an argument, an argument can never have more than one conclusion.

SELF ASSESSMENT EXERCISE 1

Which of the following passages are arguments? Which are not arguments? If a passage is an argument, identify its conclusion.

1. Americans are materialistic because they are exposed to more advertising than any other people on earth.
2. Waging war is always wrong because it involves killing human beings and killing humans is wrong.
3. Wars occur because humans desire to control other humans.
4. If one sets one's heart on humanities, one will be without evil – *Confucius, the Analects*. New York: Oxford University Press, 1993, p. 13
5. The good don't always die young because Mother Teresa was a good person.

3.2 Valid and Invalid Argument

An argument is said to be valid when the conclusion of that argument is derived from, or follows from the premises. In other words, in a valid argument, it is necessary that if the premises are true, then the conclusion is true. Thus, in any valid argument, there is an absolute connection between the premises and the conclusion. In any valid argument, it is impossible for the conclusion to be false when the premises are true, for example:

- All Americans are proud
- Peter is an American
- Therefore, Peter is proud.

What matters most here is the link between the premises and the conclusion rather than on the truth or falsity of the statements comprising the arguments, Example:

- All birds have beaks. Some cats are birds. So, some cats have beaks. Here you can see that although the second premise is false, the

argument is still valid. Because when the premises are assumed to be true the conclusion must be true also.

In logic proper, an argument can still be valid when all the premises are false. For example: All men are monkeys. All monkeys are politicians. So, all men are politicians. However, it is not also advisable to hastily conclude that an argument is valid simply because its premises are all true. Example:

- Some Nigerians are bad. Ukwa is a Nigerian. Therefore Ukwa is bad.

An argument can have true premises and true conclusion but may not necessarily be valid. Because sometimes, the premises may not support the conclusion in the right way.

“Are the premises actually true?” “Is the argument valid?” These are two distinct and fundamental questions in logic. In logic proper, validity only preserves truth but cannot preserve falsehood.

An invalid argument is the opposite of valid one. But invalid argument has a peculiar characteristic: for instance: it is not necessary that if the premises are true, then the conclusion is true.

In conclusion, any valid argument with all premises true is a sound argument. Any valid argument with at least one false premise in an unsound argument. All invalid arguments are unsound.

SELF ASSESSMENT EXERCISE 2

Which of the following statements are true? Which are false?

1. All valid arguments have at least one false premise
2. A sound argument can have a false conclusion
3. Some arguments are true
4. Every argument is valid
5. Every unsound argument is invalid

3.3 Subject or Predicate Term

Remember that we can talk either of the subject term of a proposition or the subject or the subject term of a syllogism or of an argument. But always remember that in logic proper, you must talk of the subject term of a proposition. Syllogism is more than a proposition syllogism is an argument that contains and must contain three propositions, two of

which are called the premises and one the conclusion. A typical case of a syllogism is:

- All Black women are beautiful
- Cacy Ngamen is a black woman
- Therefore Cacy Ngamen is beautiful

In this syllogism “Cacy Ngamen is beautiful” is known as conclusion and it necessarily follows from the first and second prepositions, which serve as premises of the syllogism. You can see that a whole syllogism can neither be asserted nor denied. But the sentence “Cacy Ngamen is beautiful” which stands here as a proposition can be asserted or denied. As the subject of the proposition, it is called the subject term so “Cacy Ngamen is beautiful” is the subject term of the above proposition.

As it is with the subject term, so it is with the predicate term. The logician does not talk of the predicate term of an argument or syllogism. In logic, we talk of the predicate term of a proposition. For instance, in the proposition ‘Cacy Ngamen is beautiful,’ the predicate of the proposition is ‘beautiful’.

In conclusion, you should always remember that in logic proper, subject and predicate term are associated with individual propositions only. It does not matter whether that individual proposition is a premise or a conclusion.

SELF ASSESSMENT EXERCISE 3

Use your own words to discuss subject/predicate terms in logic.

3.4 Major, Minor and Middle Terms

Major Term

Major, minor and middle terms are all parts of a syllogism but unlike predicate or subject term as seen earlier, a logician can never talk of major, minor or middle term of a proposition. For instance, in an argument or in a syllogism, the predicate term of the conclusion becomes automatically the major term of the syllogism. For example:

- All Cameroonians are footballers
- Etoo is a Cameroonian
- Therefore, Etoo is a footballer

“footballer” is the predicate term of the conclusion, in the above example. But it automatically becomes the major term of the syllogism. So, “footballer” is the major term of the syllogism. You should always

remember also that in logic, the premise containing the major term of the syllogism is referred to as the major premise of that syllogism, thus in the above example, the premise “all Cameroonians are footballers”, which contains the major term of the syllogism (footballer) becomes the major premise of the syllogism, because it contains the major term of that syllogism.

Minor Term

As it is with the major term, so it is with the minor term. That is, the logician does not talk of the minor term of a proposition, but rather of the minor term of a syllogism. Always remember that in any syllogism, the subject or the subject term of the conclusion becomes automatically the minor term of that syllogism, for instance:

- All Cameroonians are footballers
- Etoo is a Cameroonian
- Therefore, Etoo is a footballer

In the above example, Etoo is the subject term of the conclusion and it automatically becomes the minor term of that syllogism. So Etoo is the minor term of the above syllogism. In logic, the premise that contains the minor term of the syllogism is called the minor premise of that syllogism. Thus in the above example the premise “Etoo is a Cameroonian” which contains the minor term of the syllogism (Etoo) is called the minor premise because it contains the minor term of that syllogism.

Middle Term

As it is with the major and minor terms, so it is with the middle term. That is, the logician does not talk of the middle term of a proposition, but rather of the middle term of a syllogism. Always remember that in any syllogism, the term that occurs in both premises but does not occur in conclusion is called the middle term of that syllogism. For instance:

- All Cameroonians are footballers
- Etoo is a Cameroonian
- Therefore Etoo is a footballer

You can see that in the above syllogism, “Cameroonians” is the middle term because the term (Cameroonian) occurs in both the major and minor premises but does not occur in the conclusion.

SELF ASSESSMENT EXERCISE 4

What do you understand by major, minor and middle terms of a syllogism?

4.0 CONCLUSION

This study unit dealt with the definition of an argument in logic, its validity and invalidity. It dealt also with what the logician understands by predicate, subject, major, minor and middle terms.

5.0 SUMMARY

In this unit, you have been introduced to some basic concepts that logicians use. You also learnt to define an argument, differentiate between valid and invalid arguments and what predicate or subject term actually means. You also learnt what the relationship between the major, minor and middle terms is.

6.0 TUTOR-MARKED ASSIGNMENT

In your own words, define argument and statement.

7.0 REFERENCES/FURTHER READING

Layman, C. Stephen. (2002). *The Power of Logic*, (2nd ed.). McGraw-Hill.

Neneye, E. P. (2003). *Introduction to Logic and Philosophy*. Owerri: Prosperity Publisher.

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UNIT 4 VALID, INVALID, DEDUCTIVE AND INDUCTIVE ARGUMENTS

CONTENTS

1.0 Introduction

- 2.0 Objectives
- 4.0 Main Content
 - 4.1 Inductive Arguments
 - 4.2 Deductive Arguments
 - 4.3 Valid Arguments
 - 4.4 Weak and Strong Inductive Argument
 - 4.5 Sound and Unsound Argument
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the analysis of inductive and deductive arguments. It will also teach you how a deductive argument is said to be valid or invalid, how an inductive argument is said to be weak or strong. This study unit will also teach you how to define and differentiate between sound and unsound argument.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define and discuss an inductive argument
- define and discuss a deductive argument
- differentiate between a valid and invalid deductive argument
- differentiate between weak and strong inductive arguments
- define and differentiate between sound and unsound arguments.

3.0 MAIN CONTENT

3.1 Inductive Arguments

An inductive argument is that kind of argument that proceeds from the experienced (particular) to the inexperienced (general); from the known to the unknown. For instance:

- Mr. Roger Miller is a Cameroonian and a football player.
- Mr. Etoo Fils is a Cameroonian and a football player.
- Mr. Rigobert Song is a Cameroonian and a football player.
- Therefore, all Cameroonians are football players.

You can see that in the above example, the conclusion that all Cameroonians are football players (general proposition) is arrived at by sampling some members of the class of persons who are Cameroonians.

But for some logicians (Minimah & Inoka, 1997) there are also some “cases in which the propositions of an inductive argument which are used as premises and conclusions may all be either general propositions or particular propositions”. This is evident in the following arguments:

- a) All birds grow from infancy to adulthood;
All trees grow from infancy to maturity;
All men grow from infancy to adulthood;
Therefore all living things grow from infancy to adulthood
(Minimah and Inoka, 1997:72)
- b) Idi Amin was a dictator and was ruthless;
Samuel Doe was a dictator and was ruthless;
Kabila is a dictator,
Therefore Kabila is ruthless.

SELF ASSESSMENT EXERCISE 1

Define and discuss inductive argument.

3.2 Deductive Argument

Logicians define deductive argument as that kind of argument in which we move from general propositions as premises to a particular proposition as the conclusion. In a deductive argument, the derivation of a conclusion from the premises follows with absolute certainty and necessity, no matter what. But this is not the case in an inductive argument. For instance:

- All men are mortal
- Dr. Ngamen Kouassi is a man
- Therefore Dr. Ngamen Kouassi is mortal.

SELF ASSESSMENT EXERCISE 2

Define and discuss deductive argument.

3.3 Valid (deductive) Arguments

For a deductive argument to be valid, at least the following conditions must be fulfilled. In other words, a deductive argument is valid only if the:

- a) premises imply the conclusion; or

- b) premises entail the conclusion, or
- c) conclusion follows from the premises, or
- d) premises necessitate the conclusion, or
- e) conclusion can be inferred from the premises.

It follows that from the above conditions, a valid deductive argument is an argument in which the conclusion is implied by or is entailed by, or is necessitated by the premises or the premises are followed by the conclusion. You should also know that in logic proper, the words “true” or “false” are used to qualify statements or propositions. While “valid” or “invalid” are used to qualify arguments. In other words, we talk of “true” or “false” statements or propositions and “valid” or “invalid” arguments.

SELF ASSESSMENT EXERCISE 3

Define and discuss valid argument.

3.4 Weak and Strong Inductive arguments

As noted earlier, valid or invalid are words reserved for arguments only while ‘weak’ or ‘strong’ are used to qualify inductive arguments. As stated earlier, an inductive argument is based on probability. That is why logicians rather use the words weak and strong. In an inductive argument, the words strong and weak are used to indicate the level and strength of evidence or data used as premises and the degree of certainty contained in the conclusion. Any inductive argument is based on probability. Therefore, its weakness or strength depends on the degree of evidence contained in the conclusion.

SELF ASSESSMENT EXERCISE 4

Define and discuss weak and strong inductive argument.

3.5 Sound and Unsound Argument

The words “sound” and “unsound” have nothing to do with an invalid argument. They are only used to qualify a valid (deductive) argument.

Also, bear in mind that before an argument becomes sound or unsound, it must be valid beforehand. Thus a valid argument is said to be sound if the premises of that argument as well as the conclusion are all true propositions. On the other hand, a valid argument is said to be unsound if the premises of that argument are either all false or contain a mixture of true and false propositions, notwithstanding the truth value of its conclusion (Minimah and Inoka, 1997:74). Why is it possible that a

deductive argument with false premises can be described as valid? Minimah and Inoka give us a simplified answer:

- The point is that the validity or invalidity of an argument does not depend upon the truth or falsity of its premises; since an argument (deductive) is said to have a pattern or structure or form, an argument is thereby valid if it conforms or tallies with that structure or form or pattern. (1997:74)

In a deductive reasoning, the pattern or structure is what we mean by words such as imply, necessitate, followed by, entail etc. Minimah and Inoka further insist that “these words point to the fact that it is impossible for the premises of an argument to be all true while the conclusion is false. Once that happens then that argument is invalid” (1997:75). However, in their own understanding, “those words did not say that the premises could be a mixture of true and false propositions or false propositions throughout while the argument still remain valid” (1997:75) Therefore, as stated earlier, the words sound and unsound only serve to show the truth value of the premises contained in any argument. For example:

- a) All Nigerians are saints
All saints are angels
Therefore all Nigerians are angels
- b) All Nigerians are Africans
All Africans are whites
Therefore all Nigerians are whites (1979:75)

You can see that in example (a), both the two premises plus the conclusion are false propositions, yet the argument is valid, because the conclusion necessarily follows from the premises. Again, in example (b), the first premise has a true proposition; the second has a false proposition, while the conclusion is also expressed in a false proposition. But here again, the argument is valid because despite the falsity of the second premise and the falsity of the conclusion, the conclusion is validly derived from the combination of the false and true premises. So in both examples (a) and (b), the arguments are valid but unsound. Unsound in the sense that the valid argument has false premise and false conclusion (a), and one true premise and one false premise with a false conclusion (b).

Where a valid argument has all its premises and conclusion as true propositions, then that valid argument is also a sound argument. However, you should always bear in mind that the fact that an argument has all its premises true does not necessarily mean that it must be valid.

It is possible for an argument to remain invalid even if all its premises are true.

For example:

- All boys are dressed in shirts
- Some girls are dressed in shirts
- Therefore some girls are boys

Thus, any argument in which all the premises are true but has the conclusion as false proposition must be an invalid argument.

SELF ASSESSMENT EXERCISE 5

Define and discuss sound and unsound argument.

4.0 CONCLUSION

This study unit dealt with the definition, analysis of valid and invalid, weak and strong, sound and unsound arguments.

5.0 SUMMARY

In this study unit, you have been introduced to the definition and analysis of valid and invalid, weak and strong, sound and unsound arguments. You also learnt to define and discuss an inductive argument and a deductive argument. You are also able to differentiate between valid and invalid arguments and weak and strong inductive arguments.

6.0 TUTOR-MARKED ASSIGNMENT

Define and discuss inductive and deductive arguments.

7.0 REFERENCES/FURTHER READING

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UNIT 5 LANGUAGE AND ITS FUNCTIONS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content

3.1	Functions of Language
3.2	Some Models of Linguistic Analysis
3.2.1	Chomsky's Structural Analysis of the Universals of Syntax
3.2.2	Austin .J.L
3.2.3	Halliday M. A. K.
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading
1.0	INTRODUCTION

This study unit introduces you to the definition and function of language. It will also teach you some models of linguistic analysis.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define Language
- state some of its functions
- identify some models of linguistic analysis.

3.0 MAIN CONTENT

3.1 Functions of Language

As an important aspect of human culture, language has unlimited functions.

(a) Informative Function

Here, the sole purpose of language is to give information. The information can be given through whatever means: poetry, religion, etc. The information may be true or false.

(b) Expressive Function

Here, the sole purpose of language is to express feelings or attitudes. When we greet, thank or curse somebody we express our feelings.

However, it is important to note that expressive functions are not identical with information about people's feelings (Otakpor, 2000:23).

(c) Directive Function

Here, the sole purpose of language is to direct. For example, when we ask questions, make requests, our question is true or false. They are rather reasonable, proper or not. (Otakpor, 2000:23).

(d) Emotive Function

This is when language is used to evoke or propagate feelings or attitudes in human beings. For example, when we say someone is a socialist, man is really only dust or God is your father, we evoke or propagate feelings. (Otakpor, 2000:23).

(e) Commissive Function

This is when we use language to commit ourselves. For example, when you make a promise, vow or give your word. Comissives are either sincere, proper or not” (Otakpor, 2000:24).

(f) Declarative Function

“This is where “saying makes it so”. For example, “I name this place Okada,” “I hereby declare this meeting closed”, “I resign”, (Otakpor, 2000; 24).

(g) Multiple Functions

This is when language is used for several purposes simultaneously.

SELF ASSESSMENT EXERCISE 1

State some functions of language.

3.2 Some Models of Linguistic Analysis**3.2.1 Chomsky’s Structural Analysis of the Universals of Syntax**

It is not possible in this unit to explore all the classifications of language use. Chomsky is known as the forerunner in the revolution of language in recent times. According to Chomsky and his followers, a human child is equipped with information about the structural characteristics

common to all languages (*Syntactic Structures*, The Hague: Mouton, 1957). They argue that the process of language learning is best studied by comparing input with output (that is, comparing the language an infant is exposed to with the language the infant produces).

However, we cannot actually know how the brain acquires language competence. The term “language Acquisition Device” (L.A.D) is applied to this unknown quality of acquisition. According to them, the L.A.D is innately programmed and sourced, and it is overly sensitive to the universal deep structure of language in general. The main function of “Language Acquisition Device is to discover in any particular native language the grammatical rules by which the language structures are manifest.

3.2.2 Austin J.L

In the book *How to do Things with Words* (1962), Austin claims that language is not a mere set of syntactic rules for constructing sentences but rather a series of acts (speech acts) meant for achieving the communicative distortions of a speaker in any given context. For example, “if I address a question to a friend in any living room in the form: Wouldn’t it be nice to get a breadth of fresh air? I do not intend to be understood as making an inquiry into his state of respiratory physiology, but that I am rather asking him to take a walk with me in my gardens (Otakpor, 2000: 26). In Austin’s view, we are constantly fulfilling language functions by our choice and timing of utterance, and by our skill in implementing our intentions with the appropriate communication on their behalf. The use of language is part of a policy for achieving our intentions. Austin claims that our syntactic and semantic skills are usually deployed in order to get things done and to get life going.

3.2.3 Halliday M. A. K.

Halliday also analyses the function and uses of language. In his view, a function is some extra-linguistic role played by the use of language (1973: 201). In *Exploration in the Functions of Language*, Halliday proposes some functions of language as follows:

1. Instrumental: Here, we communicate to get goods and services

2. Regulatory: Here, we communicate to control the behaviour of others
3. Interactional: Here, we communicate to relate to others
4. Personal: Here, we communicate to express one's unique state or feelings
5. Heuristic: Here, we communicate to get information about one's immediate surroundings
6. Imaginative: Here, we communicate to create a symbolic world with another
7. Informative: Here, we communicate to inform about or examine what is not known (1973: 201).

Language proper always includes two things: meaning and sound. Practically, before the period of L.A.D, we use sound to get things done, to control and relate to others and to express feelings. For example, when a body cries, either of the following may be the case; (a) the nappies may be wet (b) the body may be the hungry, (c) the body is in need of sheep or (d) any combination of (a)-(c), or all of them taken together: (Otakpor, 2000: 22) with time, the baby will gradually ascend to the lexicon-grammatical level involving a set of procedures where sound is reshaped into words in utterances. And, for Halliday, it is the methatic stage and function where “newly acquired vocabulary is used for the purpose of categorising the phenomena of the environment and relating them to own experience” (1973: 205).

SELF ASSESSMENT EXERCISE 2

State and discuss some models of linguistic analysis.

4.0 CONCLUSION

This study unit dealt with functions and uses of language.

5.0 SUMMARY

In this study unit we analysed and discussed some functions and uses of language. You learnt about some functions of language and some models of linguistic analysis.

7.0 TUTOR-MARKED ASSIGNMENT

Why is Language an important aspect of human culture?

7.0 REFERENCES/FURTHER READING

Otakpor, Nkeonye. (2000). *A Preface to Logic*. Benin City: Omone Books.

MODULE 3

Unit 1	Fallacies (Part One)
Unit 2	Fallacies (Part Two)
Unit 3	Definitions (Part One)
Unit 4	Definitions (Part Two)
Unit 5	Categorical Propositions

UNIT 1 FALLACIES (PART ONE)

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 5.0 Main Content
 - 5.1 Definition and Classification of Fallacies
 - 5.2 Fallacies Involving Irrelevant Premises
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading
- 1.0 INTRODUCTION**

This study unit introduces you to the definition and classification of fallacies. Our emphasis here will be particularly on fallacies involving irrelevant premises.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define and classify fallacies
- identify major fallacies involving irrelevant premises such as:
 - argument against the person
 - straw man
 - appeal to force
 - appeal to the people
 - appeal to pity
 - appeal to ignorance.

3.0 MAIN CONTENT

3.1 Definition and Classification of Fallacies

There is no doubt that some errors in reasoning are so obvious that someone does not need to be told. This is the case for instance of one plus one equal two. Therefore Nigeria is America.

But this is not the case all the time. In logic for instance, there are some errors in reasoning that tend to be psychologically persuasive, logicians call such errors fallacies. Thus a fallacy is an error in reasoning that tends to be psychologically persuasive. It is an invalid argument that has the deceptive appearance of being valid.

There is no universal classification of fallacies. But in most introductory textbooks in logic, there has always been a tentative classification. Otakpor (2000) classifies it as follows:

(a) Formal/purely logical:

In this kind of fallacy, the defect arises as a result of lack of conformity with a type of valid argument. This happens for instance, when the middle term is undistributed.

(b) Verbal or Semi-logical

In this form of fallacy, there is always a sentence of some sort of valid forms of argument but not exactly because of a word or words used in different senses. This is most observable in the fallacies of ambiguity.

(c) Material / informal

Here whether valid or not the argument is fallacies because:

- The premises are false
- Appeals are mainly to feelings
- There is no structure of argument at all
- Argument is not directed to the thesis in question.

SELF ASSESSMENT EXERCISE 1

Define and classify fallacies.

3.2 Fallacies Involving Irrelevant Premises

In logic, we have formal and informal fallacies. Within informal fallacies there are fallacies involving irrelevant premises, fallacies involving ambiguity and fallacies involving unwarranted assumptions. The difference between formal and informal fallacies is that, a formal fallacy always involves the explicit use of an invalid form which is not the case with informal fallacy.

Fallacies involving irrelevant premises are kinds of informal fallacies that involve the use of premises that are logically irrelevant to their conclusions, but for psychological reasons, the premises appear relevant. The most common of such informal fallacies are as follows:

(a) Argument against the person (Ad Hominem fallacy)

The main business of this argument is to attack the person who advances an argument rather than providing a rational critique of the argument itself. The attacker's main objective is to make the assertion acceptable, look at this for instance:

- Mr. A: President Umaru Musa Yar'Adua of the Federal Territory of Nigeria will be the next African Union Chairman
- Mr. B: Mr. Umaru Musa Yar'Adua is the president of one of the most corrupt countries in the world. Therefore it is impossible for him to become the future African Union chairman.

An argument against the person does not always involve outright verbal abuse. Subtle ways are sometimes used but with the sole aim of discrediting an opponent by suggesting that the opponent's judgment is distorted by some factor in his or her circumstances. This form of argument is sometimes called the circumstantial ad hominem. For instance, during the celebration of their marriage, Mr. and Mrs. Kunle refused to serve beer to their guests. They claimed that no born again child of God would either drink or serve beer to other persons. Here, you can see that Mr. and Mrs. Kunle commit the circumstantial form of the argument ad hominem fallacy. You should always remember that the attack in the argument against the person can take three forms:

- i) Abusive ad hominem: direct personal attack on the opponent.
- ii) Circumstantial ad hominem: attempt to discredit by calling attention to the circumstances or situation of the opponent.
- iii) Tu quoque: charges the opponent with hypocrisy or inconsistency.

(b) Strawman

A strawman fallacy occurs whenever the arguer attacks a misrepresentation of the opponent's view. This fallacy is mostly used in policies. It consistently makes use of rhetoric and Eristic. Eristic being the disputational art of making weaker case the stronger one. Strawman fallacy usually occurs when the arguer or attacker refuses to be fair and charitable in demands that we represent the original accurately and

charity demands that we put an argument in its best light when we are confronted with interpretive choices. The debate over the Equal Rights Amendment (ERA) brought in an obvious example of strawman fallacy. The entire text of the ERA is stated thus: “Equality of rights under the law shall not be denied or abridged by the United States or by any State on account of sex”.

The Guide to American Law: Everyone’s legal Encyclopaedia, Vol. 4 (New York: West, 1984, p. 352).

Backers of the Equal Rights Amendment (ERA) decided to misrepresent the text. Their belief in total equality of the sexes also implies “equal pay for equal work”. In their own understanding, 50 percent of the players in the National Football league should be women. Moreover, there should no longer be separate public bathrooms for men and women. Always remember that we can talk of strawman fallacy when a view or argument is alleged to involve assumptions that it does not or need not involve. Look at the following questions: Susan advocates the legalisation of cocaine. But I cannot agree with any position based on the assumption that cocaine is good for you and that a society of drug addicts can flourish. So, I disagree with Susan. (Layman, 2002:125) This is a strawman fallacy because obviously, one can consistently advocate the legalisation of cocaine and yet believe that cocaine is not good for people.

Also bear in mind that sometimes persuasive or biased definition can be used to set up a strawman fallacy. Professor Anthony Flew, in his book captioned *A Dictionary of Philosophy* defines “empiricism” as “the thesis that all knowledge or at least all knowledge of matters of facts (as distinct from that of purely logical relations between concepts) is based on experience (1979: p.104). However, partisans of straw man fallacy understand empiricism as the view that nothing should be believed in unless it can be directly observed. Now no one can see, hear, taste, smell or touch protons, electrons, or quarks. So, while empiricists pretend to be advocates of science, their views in fact rule out the most advanced physical science of our times (Layman,2002:126). _

c) Appeal to Force (Ad Baculum Fallacy)

Baculum is a Latin word which stands for “staff”. Here, staff being a symbol of power. The ad baculum fallacy is mostly used whenever a conclusion is defended by a threat to the well-being of those who do not accept it. The threat can be physical, moral or psychological. It can be implicit or explicit. Here is the case of a physical threat:

- Mr. Jones, you helped us import the drugs. For this, the Boss is grateful. But now you are entitled to 50 percent of the profits. The Boss says you are entitled to 10 percent. Unless you see things the Boss's way, you are going to have a very nasty accident. So, you are entitled to 10 percent. Got it (Layman, 2002:127).

You can see here that there is no logical link the threatened “nasty accident” on the conclusion (“Jones is entitled to 10 percent”.) But it is probable that the threat might induce Jones to accept the conclusion.

Here is the case of a psychological threat:

- Listen, Valerie, I know you disagree with my view about the building project. You have made your disagreement clear to everyone. Well, it's time for you to see that you are mistaken. Let me get right to the point. I know you have been lying to your husband about where you go on Wednesday afternoons. Unless you want him to know where you really go, it's time for you to realize that I have been right about the building project all long. You follow me? (Layman, 2002, p. 127).

You can see here that even though the threat to expose the lie has no relationship with the building project, it may still work because fear is a strong motivator, and it can influence, someone's thinking.

d) Appeal to the People (Ad populum fallacy)

Remember that “Populum” is a Latin word which stands for “people” or “notion” so ad populum fallacy occurs when you try to persuade someone or a group by appealing to the emotion, feeling, sentiments of the people. This is mostly used in political campaigns, public debates and advertising. Here is a typical case of political campaign:

- I look out at you all, and I tell you, I am proud to be here. Proud to belong to a party that stands for what is good for America. Proud to cast my lot with the kind of people who make this nation great. Proud to stand with men and women who can get our nation back on its feet. Yes, there are those who criticise us, who label our view of trade agreements as “protectionist”. But when I look at you hard-working people, I know we are right and the critics are wrong”. (Layman, 2002: 128).

You can see that the sole purpose of this speech is to persuade the crowd no matter what. It is fallacy because premises to the effect that “I am proud to be associated with you” and “you are hard working people” are irrelevant to the conclusion: “our view of trade agreements is right”.

Also, bear in mind that you do not necessarily need to address a large group before you commit the ad populum fallacy. Whatever you try to convince by appealing to the need of or acceptance of your view by other people, you commit the ad populum fallacy. Here is an example:

- Ms Riley, are you saying that President Bush made a moral error when he decided to go to war with Iraq? I cannot believe my ears. That is not how Americans feel. Not true Americans, anyway. You are an American, aren't you Ms Riley? (Layman 2002: 128).

This is a fallacy because there is no logical connection between the fact that Ms Riley is an American therefore Iraq war must be justified.

e) Appeal to pity (Ad Misericordian Fallacy)

Misericordian is a Latin word that stands for "pity" or mercy". So, ad misericordian fallacy is the attempt to support a conclusion simply by evoking pity in one's audience even though the statements that evoke the pity are logically unrelated to the conclusion. Take for instance the case of a young man under trial for the murder of his parents who thereafter pleads for leniency because he is now an orphan. (Otakpor, 2002:31). The appeal to pity is mostly used by lawyers. The lawyer's main objective is to get the court to accept the conclusion that a client is innocent or at least to obtain a reduction in the measure of punishment.

f) Appeal to Ignorance (Ad Ignorantian fallacy)

The appeal to ignorance means that the conclusion of an argument is proven simply because nobody has proved the opposite. Here is a typical example:

1. After centuries trying, no one has been able to prove that reincarnation occurs. So at this point, I think we can safely conclude that reincarnation does not occur.
2. After centuries of trying, no one has been able to show that reincarnation does not occur. Therefore, reincarnation occurs. You can see that this fallacy has its own limits. It has not been proven may be erroneous. This logic cannot hold in scientific matters mostly based on hypothesis and "wait and see" attitude. Besides it is not mandatory to believe or disbelieve every statement we consider. Neutrality is a logical attitude as well.

SELF ASSESSMENT EXERCISE 2

Define and discuss some fallacies involving irrelevant premises.

4.0 CONCLUSION

This study unit dealt with the definition and classification of fallacies. It dealt specifically with fallacies involving irrelevant premises.

5.0 SUMMARY

This study unit has attempted to define and classify fallacies. It has emphasised particularly on fallacies involving irrelevant premises. You have learnt to define and classify fallacies and discuss fallacies involving irrelevant premises.

6.0 TUTOR-MARKED ASSIGNMENT

Define and classify fallacies.

7.0 REFERENCES/FURTHER READING

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UNIT 2 FALLACIES (PART TWO)

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 5.0 Main Content
 - 5.1 Fallacies Involving Ambiguity
 - 5.2 Fallacies Involving Unwarranted Assumptions

- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

As already stated, although studies units are autonomous, they are interconnected as well. This study unit is the continuation of the preceding one. But here, we will particularly emphasise on fallacies involving ambiguity and unwarranted assumptions.

2.0 OBJECTIVES

At the end of the unit, you should be able to:

- define and discuss fallacies involving ambiguity such as:
 - 1) equivocation
 - 2) amphiboly
 - 3) composition and division
- define and discuss fallacies involving unwarranted assumptions such as:
 - i. begging the question (Petitio Principii)
 - ii. false dilemma
 - iii. appeal to authority (Ad Verecundian fallacy)
 - iv. false fallacy and
 - v. complex question.

6.0 MAIN CONTENT

3.1 Fallacies Involving Ambiguity

There are some statements that involve a subtle confusion between two closely related concepts and therefore become ambiguous. Logicians call it fallacy involving ambiguity. We shall focus here only on the four major fallacies of ambiguity.

1) Fallacy of Equivocation

There are some words that contain more than one meaning. The fallacy of equivocation occurs when such a word is used in a manner that implies different meanings or senses of the word within the same context. For instance: only man is rational. But no woman is a man.

Therefore, no woman is rational. This is a fallacy of equivocation because the word “man” is used with two different senses within the same context. In the first sentence, the word “man” means “humans” while in the second, it means “male humans”.

2) Fallacy of Amphiboly

The fallacies of amphiboly and ambiguity are very similar. The only difference is that in the fallacy of amphiboly, the double meaning is due to syntactic or sentence structure such as a grammatical error or a mistake in punctuation. The fallacy of amphiboly is more subtle and harder to detect than that of Equivocation. It mostly occurs when we misinterpret someone’s original statement or intention. Here are typical cases.

- Professor N. Otakpor gave a lecture on homicide in the University of Benin Law Auditorium. I gather that a lot of people have been murdered in that hall.
- “If Nigeria under Yar’Adua goes to war against George Bush of America, then Yar’Adua would destroy a populous nation” this is an amphibolic statement because it has more than one acceptable meaning. America and Nigeria are both populous nations. There is a fallacy of amphiboly here because it is not clear whether the “populous nation” to be destroyed is America or Nigeria should Yar’Adua “go to war against George Bush”.

3) Fallacy of composition

There are two major ways of committing the fallacy of composition. These are:

- i) When a part is identified with the whole. That is, the parts have the attribute “X” therefore the whole has attribute “X”. For instance, each of the parts of this car engine is very light, therefore the car engine is very light. Each player on the football team is outstanding. Hence, the team itself is outstanding.

The fallacy of composition is committed here because even though the car engine is made up of very light parts but when put together, the car engine itself becomes very heavy. It is the same with the football team. Even though each of the players is outstanding and there is a lack of team work or insufficient opportunity to practice together, the team as a whole may not be outstanding.

- ii) The second kind of the fallacy of composition is committed when there is confusion between the “distributive” and “collective” use of general terms, for example:
- Elephants eat more than humans. So, elephant taken as a group eat more than humans taken as a group.

There is a fallacy of composition here because in the premises: “Elephant eat more than humans”, the attribute of “eating more than” is predicated distributively, that is, each individual elephant is said to eat more than any individual human eats. However, in the conclusion, the attribute “eating more than” is predicated collectively; that is, elephant taken as a group are said to eat more than humans taken as a group which is not true because there are so many more humans than elephants.

iii) Fallacy of Division

The fallacy of division is nothing more than the opposite of composition. In the fallacy of division, if the whole has the attribute “X”, therefore the parts must have the attribute “X” as well.

Example: the airplane is heavy, so each of its part is heavy.

There is a fallacy of division here because some of the parts of a heavy air plane may be very light.

Here is an example of the second type of division fallacy; the soccer team is excellent. Hence, each member of the team is excellent.

There is a fallacy of division here because a team may be excellent due to team work and few outstanding players and yet have members who are not themselves excellent players.

SELF ASSESSMENT EXERCISE 1

Define and discuss some fallacies involving ambiguity.

3.2 Fallacies Involving Unwarranted Assumptions

What we call “unwarranted assumptions” are some errors in reasoning which in context stand in need of support, but most of the time, the support is not always provided thus making the assumption illegitimate or unjustified. This undermines the force of the argument. It is not always easy to detect fallacies involving unwarranted assumptions. In

this section, we are going to study at least five major fallacies involving unwarranted assumptions.

ix. **Begging the question (Petitio Principii)**

Petitio principii is a Latin expression which means “begging the principle”. In logic, we beg the question when we assume the conclusion to be proven. Arguing in circle is another way of begging the question. Example:

- The defendant is not guilty of the crime, for she is innocent of having committed it.

There is fallacy here because the conclusion of the argument is almost the rephrased version of the premise. And, in logic proper, we cannot reasonably claim to discover a truth by inference when that truth is itself included in the premises of our argument. So, even if the above example is sound, you can still see it is defective in that it assumes the conclusion to be proven.

x. **False dilemma**

In logic, the fallacy of false dilemma simply means that you use a premise that unjustifiably reduces the number of alternatives to be considered. In other words, there is a fallacy of false dilemma when the arguer assumes without justification, a limited number of possible alternatives when actually there is more than that. Here is a typical case:

- I’m tired of all these young people criticising their own country.
- What I say is this, “Nigeria, love it or leave it! And since these people obviously do not want to leave the country, they should love it instead of criticising it.

There is a fallacy of false dilemma here because the argument presupposes that there are only two options: either you love Nigeria (uncritically) or you emigrate. However, you should know that there are other possibilities or alternatives.

You should also know that an argument cannot be called false dilemma unless you are able to specify at least one alternative that has been ignored.

xi. **Appeal to authority (Ad verecundiam fallacy)**

Ad Verecundiam is a Latin phrase which means “appeal to authority”. So, ad verecundiam fallacy occurs when you appeal to an authority even though the reliability of that authority can be reasonably doubted. In

other words, *ad verecundiam* is committed when there is doubt about whether an authority is reliable or not. Always keep in mind that a reliable authority is one who can be counted on to provide correct information in a given area. For example, when we cite encyclopaedias, dictionaries, textbooks or maps, we do not commit the *ad verecundiam* fallacy.

The fallacy of appeal to authority is most common in advertising. Some products are usually endorsed by some celebrities even when they lack the required expertise. Here is a typical example: Prof. Otakpor of the Department of Philosophy University of Benin says red wine is very good for blood circulation. So, red wine is very good for blood circulation.

There is an *ad verecundiam* fallacy here because even though Prof. Otakpor is known as a good professor of Philosophy, there is serious doubt whether he is an expert in human physiology. And, there are many cases of this nature particularly in advertising.

Another difficulty in detecting *ad verecundiam* occurs when a well – known expert in one field is cited as an expert in another field even if he or she lacks expertise in it. This kind of fallacy easily occurs when the two fields are related.

xii. False Cause Fallacy

There are many forms of false cause fallacy. But the most common form is called in Latin *post hoc, ergopropter hoc*, which means “after this, therefore because of this”. Generally, a false cause fallacy occurs when the arguer illegitimately assumes a possible cause of a phenomenon to be the only cause although reasons are lacking for excluding other possible causes. Here is an example:

Since I came into office two years ago, the rate of violent crime has decreased significantly. So, it is clear that the longer prison sentences we recommended are working (Layman, 2000: 151).

There is false cause because the longer prison sentences may be a causal factor, but the simple fact that the longer sentences preceded the decrease in violent crime does not prove this. There is no doubt that other causal factors need to be considered.

You should also remember that it is not every false cause fallacy that involves the unwarranted assumption that if X precedes Y, then X causes Y.

Slippery Slope

This is a special variety of false cause. This fallacy occurs when “the arguer assumes that a chain reaction will occur but there is insufficient evidence that one (or more) events in the chain will cause the others” (Layman, 2000:153).

It is clear from the above example that gambling is not a risk-free practice. But there is no logical cause or sufficient evidence to show that buying a lottery ticket will cause you to die homeless and lonely. This is simply a slippery slope fallacy. This fallacy has a unique quality in the sense that it, most of the time, plays on our deepest fears. It is on record that during the Vietnam War, most people frequently claimed that “If Vietnam fell to communism, a chain reaction would occur, with the result that many countries would come under communist rule” (Layman, 2000: 153). But history shows that there is no solid evidence that such a chain reaction would have occurred. Indeed, many Americans feared that it would. And, this was simply a slippery slope fallacy.

xiii. Complex Question

In logic, a question is complex when the questioner presupposes some conclusion alluded to in the question. Here are typical examples of complex questions:

- a) Have you stopped beating your wife?
- b) Why is physics so boring?

These questions contain the fallacy of complex question. In (a) for instance, the questioner has already presupposed that you used to beat up your wife. In (b) he assumes that physics is uninteresting/boring.

SELF ASSESSMENT EXERCISE 2

Define and discuss some fallacies involving unwarranted assumptions.

4.0 CONCLUSION

This study unit dealt with fallacies of ambiguity and unwarranted assumptions.

5.0 SUMMARY

In this study unit, we have attempted to define and discuss some fallacies involving ambiguity and unwarranted assumptions. You have

learnt to define and discuss fallacies involving ambiguity and to define and discuss fallacies involving unwarranted assumptions.

6.0 TUTOR-MARKED ASSIGNMENT

Define and discuss some major fallacies involving ambiguity and unwarranted assumptions.

7.0 REFERENCES/FURTHER READING

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UNIT 3 DEFINITIONS (PART ONE)

CONTENTS

- 1.0 Introduction
- 2.0 Objective
- 5.0 Main Content
 - 5.1 Types of Definitions
 - 5.2 Lexical Definitions

5.3	Theoretical Definitions
5.4	Intentional and Extensional Definitions
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

A definition is a *sine qua non* tool for effective communication. We cannot avoid vagueness, ambiguity or equivocation unless we rightly define our words or terms. It is the major means through which we understand the meaning of words. It is different from explanation, biverbal definition, translation or mere interpretation. It is true that definition contains all of them but they are not identical. Definition is different from them in the sense that it is sharp, short, delimited and consisting of the word to be defined, that is, the definiendum (which may be a single word) and the expression which defines the expression that is, the definitions (which must contain more than one word) (Stebbing, 1993: 423 – 425).

Although there are so many types of definitions, this section introduces you to the major types of definition that are most helpful in clarifying and sharpening arguments.

2.0 OBJECTIVE

At the end of this unit, you should be able to:

- define and discuss some types of definitions.

3.0 MAIN CONTENT

As stated earlier, although there are so many types of definition, this section is to introduce you to the major types of definition that are most helpful in clarifying and sharpening arguments.

3.1 Major Types of Definitions

In most introductory logic textbooks, although it is not universal, we can identify at least seven major types of definitions. This section will focus only on the lexical, theoretical, intentional and extensional definitions.

3.1.1 Lexical Definition

A lexical definition is identical with a dictionary definition. It is the conventional or established meaning of a term. Here are typical examples of lexical definitions:

- a) “Immanent” means existing or remaining within, that is, inherent.
- b) “Imminent” means about to occur (*The American Heritage Concise Dictionary*, 1997: 417)

You should also know that lexical definitions have what is called “truth value,” that is, “they are either true or false. They are true if they correctly report the establishment intention of the term and false if they fail to do this” (Layman, 2000:98).

3.1.2 Theoretical Definition

In Layman’s word, “a theoretical definition is an intentional definition that attempts to provide an adequate understanding of the thing(s) to which the term applies (2000:100). It is different from lexical definition in the sense that it is more accurate and it goes deeper to understand the nature of things. There are some terms that need to go beyond their lexical definition according to their context. Here are some typical terms “virtue”, “temperature”, “mass”, “truth”, “space”, “knowledge” and “time”. Whenever these terms are mentioned by philosophers for instance, the necessity to go beyond their mere lexical definitions becomes unavoidable. Plato’s definition of “right” in one of his dialogues captioned “Euthypro” is quite interesting. According to him, “right means approved of the gods” (1981:12).

It is on record that because of the polytheistic nature of ancient Greek religion, Socrates, one of Plato’s heroes in the dialogue, objected to this definition by pointing out that the same act may be approved by one god but disapproved by another god.

3.1.3 Intentional and Extensional Definitions

You cannot attain clarity about meaning unless you succeed in distinguishing between intentional and extensional definitions. According to Copi, an intentional definition is “the collection of properties shared by all and only those objects in a term’s extension” (1978:125). For instance, the intentional definition of a term like **Zebra** refers us to certain four footed animal that has white and

black stripes throughout the body. This is the intentional definition of **Zebra** because Zebra as a species falls under this characterisation.

So only Zebras as a species have the distinctiveness and universality of the definition as it applies to them. In other words, the extension of a term consists of the set of things to which the term applies while the intension of a term consists of the properties a thing must have in order to be included in the term's extension. And, according to Salmon Wesley, since you can specify the meaning of a word through its extension or its intension, the distinction between extensional and intentional definitions becomes very necessary in language (1984:114).

There are two types of extensional definitions: non-verbal (or ostensive) and verbal. Ostensive definition occurs when you attempt to specify the meaning of a term by pointing to objects in its extension. For instance, if you want to teach someone the meaning of the word "car", you simply need to point to a car and utter the word "car". Keep in mind also that this definition does not go without some problems. For instance, there are cars with different shapes, sizes and makes. In verbal definition we rely on signification, that is, we use verbal definition to specify the meaning of a term. Here is an example of an enumerative verbal extensive definition: "Philosopher" means someone such as Socrates, Plato, Aristotle, Descartes, Kant, or Hegel (Layman, 2000:97).

4.0 CONCLUSION

This study unit dealt with some types of definition.

5.0 SUMMARY

In this study unit you were introduced to some types of definitions. You have learnt to discuss Lexical definition, define and discuss theoretical definition and define and discuss Intentional and Extensional definitions.

6.0 TUTOR-MARKED ASSIGNMENT

In your own words, define and discuss Lexical, Theoretical, Intentional and Extensional definitions.

7.0 REFERENCES/FURTHER READING

The American Concise Dictionary. (1997).

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UNIT 4 DEFINITIONS (PART TWO)

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 5.0 Main Content

5.1	Stipulative Definition
5.2	Real Definition
3.3	Definition by Genus and Difference
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to three major types of definitions.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define and discuss stipulative definition
- define and discuss real definition
- define and discuss definition by genus and difference.

3.0 MAIN CONTENT

3.1 Stipulative Definition

As a writer or speaker, you are free either to introduce a new word into language or to give a word a new meaning. Once you do that, you are stipulating. According to Kahane, a stipulative definition is one that specifies or stipulates the meaning of a word or phrase (1973: 238). It is on record that until the year 2000, the word “double-dodge” had no generally accepted meaning.

“Double–dodge” means the anticipatory movements people commonly make when they nearly collide with some person (as when walking toward each other in a confined space) and are trying to avoid such collision” (Layman, 2000: 98).

For instance: “Rebecca and Eduardo nearly ran into each other in the hallway; but at the last moment they double – dodged and then came to a full stop, whereupon Rebecca burst into laughter. Thus, even though the “double – dodge” is stipulated here, we still understand the full meaning of the above expression. Always keep in mind that any stipulative definition is a recommendation or proposal to use a term in a certain manner. That is why as a recommendation or proposal, a

stipulative definition is neither true nor false, but under some circumstances a stipulative definition can turn into a lexical one.

3.2 Real Definitions

According to D.P. Gorsky, a real definition is one that specifies and unambiguously distinguishes the object in question from other objects of a given domain (1974: 12-19). In other words, the main business of real definition is to reduce the vagueness of a term by imposing limits on conventional meaning. According to Gorsky, Aristotle was the first European logician to study the logical procedure of defining the essence of things. Plato was the first to talk about real definition: Aristotle only systematised it. Real definitions are most common both in science and law. For instance, in ordinary English, the word “velocity” simply means “speed”. But physicists go beyond the ordinary definition. According to them, “velocity” means rate of motion in particular direction.

3.4 Definition by Genus and Difference

It is a tautology to say that the method of definition by genus and difference is very important in language and thinking. Indeed, it is known as one of the best ways to reduce ambiguity and vagueness. The definition by genus and difference also encompasses some other methods of definition such as: stipulative, précising or real, theoretical and lexical definitions.

“Definiendum” and “definiens” are two key words you must master before you can understand the method of definition by genus and difference. The “definiendum” stands for the word being defined while the “definiens” is the word or words that do the defining.

You also need some clarifications concerning proper sub-class, genus, species and difference.

For a class X to be a proper sub-class of another class Y, every member of class X must be a member of class Y. For example, the class of collies is a proper sub class of dogs. For the above explanation, it is clear that the species is simply a proper sub class of the genus ‘dog.’ You should also note that the way these terms are used here is different from the use they are given in biology. In logic, the difference is the attribute that distinguishes the members of a given species from the members of other species in the same genus (Layman, 2000:101).

The process of constructing a definition by genus and difference is as follows:

- 1) Choose a term that is more general than the term to be defined and name it genus.
- 2) Find a word or phrase that identifies the attribute that distinguishes the species in question from other species in the same genus. For instance,

<u>Species</u>	=	<u>Difference</u>	<u>Genus</u>
“Stallion”	=	male	horse
“Kitten”	=	young	cat
“Banquet”	=	elaborate	meal
“Lake”	=	large	inland body of standing water

(Layman, 2000: 102)

There are at least six criteria we need for the method of definition by genus and difference to be actually adequate.

Criterion 1: A definition must not be obscure, ambiguous, or figurative.

Example: “faith means true belief”

Criterion 2: A definition should not be circular.

Example: “Metaphysics” means the systematic study of metaphysical issues.

Criterion 3: A definition should not be negative if it can be affirmative.

Example: “Mammal” means an animal that is not reptile, not an amphibian, and not a bird.

Criterion 4: Definitions should not be too wide (or too broad)

Example: “Bird” means animal having wings.

Criterion 5: Definitions should not be too narrow.

Example: “Bird” means feathered animal that can fly.

Criterion 6: A definition is flawed if the definiens picks out the right extension via attributes that are unsuitable relative to the context or purpose.

Example: “Seven” means the number of days in a week, “Human” means a featherless biped.

4.0 CONCLUSION

This study unit dealt specifically with types of definitions.

5.0 SUMMARY

This study unit has introduced you to the various types of definitions. You have also learnt to define and discuss stipulative definition, define and discuss real definition and define and discuss definitions by genus and difference.

6.0 TUTOR-MARKED ASSIGNMENT

1. Match the definition on the left to the letter of the item on the right that best characterises it.

- | | |
|--|----------------------------|
| (i) “Tall man” means male human over 6 feet in height. | A) Enumerative definition |
| (ii) “Tome” means large book | B) Definition of sub class |
| (iii) A “sound argument” is one that has only true premises | C) Lexical definition |
| (a) Is valid (<i>i.e., its conclusion cannot be false while its premises are true</i>) | D) Stipulative definition |
| (b) “Humans” means rational | E) Précising definition |
| (iv) “Humans” means rational | F) Theoretical definition |

2. Identify one defect in each of the following definitions, using the six criteria for definition by genus and difference.

- (i) “Penguin” means bird that can’t fly, but not an ostrich, cassowary, or emu.
- (ii) An “Octagon” is a figure shaped like a stop sign.
- (iii) A “triangle” is a closed – plane figure having three sides of equal length
- (iv) An “ellipse” is a cross between a circle and a rectangle.
- (v) “Homosexual” means a man who is erotically attracted exclusively (or at least primarily) to other men.
- (vi) A “wealthy person” is one who has as much money as Bill Gates or Aliko Dangote.
- (vii) “Evil” is defined as the darkness that lies within the human soul.
- (viii) “Blue” means having a bluish color
- (ix) Time is the great container into which we pour our lives
- (x) “Oligarchy” means a form of government in which the ruling power belongs to a few persons.

3. Match the definition on the left with best definiens available on the right. These definitions are theoretical in type.

- | | |
|------------|---|
| 1. Courage | A. Confidence that a proposition is true. |
| 2. Justice | B. A tendency to perform acts the agent considers dangerous but worth the risk. |
| 3. Faith | |

- | | |
|------------------------|--|
| 4. Evidence | C. Knowledge of which ends are worth achieving and of how to achieve them. |
| 5. Wisdom | |
| 6. Virtues | D. Traits that hinder one from living well. |
| 7. Belief | E. Considerations relevant to the truth of the proposition in question. |
| 8. Suspending judgment | F. Confidence that a proposition is false. |
| 9. Vices | |
| 10. Disbelief | G. Believing in spite of factors that may tend to cause doubt. |
| | H. Giving each individual his or her due. |
| | I. Traits enabling one to live well. |
| | J. A lack of confidence in the truth of a proposition combined with a lack of confidence in its falsehood. |

7.0 REFERENCES/FURTHER READING

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UNIT 5 CATEGORICAL PROPOSITIONS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content

3.1	The Universal Affirmative Proposition
3.2	The Universal Negative Proposition
3.3	The Particular Affirmative Proposition
3.4	The Particular Negative Proposition
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading
1.0	INTRODUCTION

This study unit introduces you to different types of categorical propositions. It will focus specifically on what logicians call categorical propositions such as universal affirmative and negative, particular affirmative and negative.

As stated earlier (Module 2, Unit 2) in logic, proper statements and proposition are synonymous and therefore interchangeable. So to a logician, a proposition is that statement that can both be denied or asserted. These propositions are of four types and form two pairs, each pair having two propositions with it. The two pairs derive their names from the Latin words *Affirmo* and *Nego* which stand for affirmative and negative, respectively. Under *Affirmo* we have Universal Affirmative and Particular affirmative while in *Nego* we have Universal Negative and Particular Negative.

In its standard form, a categorical proposition is as follows: quantity/subject, class/quality, copula/predicate class. The quality, also understood as the number of members of the subject class is usually indicated by quantifiers such as All and Some. While the quality is the affirmation or negation of the verb/copula is, which is taken as a symbol not of identity but of inclusion. There is also a shorthand way of expressing the categorical positions individually.

A is for universal affirmative: All S is P
 E. is for Universal Negative: No S is P
 I is for particular affirmative: Some S is P
 O is for particular Negative: Some S is not P.

2.0 OBJECTIVES

At the end of this study unit, you should be able to:

- define a categorical proposition
- define and discuss universal affirmative proposition
- universal Negative Proposition
- particular affirmative proposition

- particular Negative proposition
- differentiate between quantifiers, quality, quantity and distribution.

3.0 MAIN CONTENT

3.1 The Universal Affirmative Proposition (All S is P)

The universal affirmative proposition contains two major distinct characteristics. First, as a proposition, it always makes a universal statement, that is, a statement which embraces all the persons, objects or concepts belonging to any particular class. Secondly, a universal affirmative proposition always makes positive statement or affirms something about the universal class. For instance, a statement such as All Human Beings falls under the category of a universal proposition. You can see that the statement All Human Beings includes everyone: men, women, boys and girls of all ages. It also includes all the races. In fact, the statement All Human Beings simply refers to all those who have human attribute.

Besides, if you go on to say, All Human Beings are Mammals, then you will be making a universal affirmative proposition. You will be saying something positive or affirming something about all human beings, that is, that they are mammals. Your statement is categorical because you have not expressed any doubt as regards whether they are mammals (Otakpor, 2000: 58).

You should also keep in mind that the use of the adjective All to stress the universal character of this proposition is not always necessary. It is conventionally understood that some propositions without the adjective All can be universal. For instance, the statement Human Beings are MAMMALS clearly implies that all human beings are mammals. The adjective “All” is also called a “Quantifier”.

Here are some examples of Universal Affirmative propositions:

- a) Bride prices should be abolished
- b) Men should contend themselves with one wife
- c) All politicians are liars
- d) All private schools are profit –making
- e) All educated Nigerian girls are proud
- f) All taxi – drivers have dear vision
- g) All policemen take bribes

h) All economists are stingy.

If you look carefully at the above propositions, you will discover that most universal propositions are not often true. They may be persuasive because they are widely believed. These examples also expose you to the danger of making broad assertions or claims.

SELF ASSESSMENT EXERCISE 1

Define and discuss some Universal Affirmative Propositions.

3.2 The Universal Negative Proposition (No S is P)

The Universal Affirmative and Universal Negative propositions share the same characteristics. The only difference lies in the fact that one affirms while the other denies. That is, the universal affirmative proposition makes affirmative statements while the universal negative proposition makes negative statements. For example, if the universal affirmative proposition says All Human beings are mammals, the universal negative proposition will say No human beings are mammals. However, they make an all- embracing and sweeping general statements which may sound plausible, but which may be false (Otakpor, 2000:64). As stated earlier, universal propositions mostly depend on public bias or prejudice either for or against something, persons, a class or objects. For this reason, it is not often true.

SELF ASSESSMENT EXERCISE 2

Define and discuss some similarities and dissimilarities between universal affirmative and universal negative propositions.

3.3 The Particular Affirmative Proposition (S is P)

As already stated, we have two pairs of categorical propositions: Affirmative and Negative. Under the pair of affirmative we have the universal affirmative and the particular affirmative proposition. The difference between the two lies in the fact that the particular Affirmative proposition makes a statement about some but not all of the members of any class of objects or persons. For instance, if you make a statement such as some Christians are Catholics, you are simply making a particular affirmative proposition.

You are making a positive statement about some members of the class of Christians, that is, that some Christians are Catholics, not that all Christians are Catholics.

SELF ASSESSMENT EXERCISE 3

Define and discuss some particular affirmative propositions.

3.4 The Particular Negative Proposition (Some S is not P)

It is the opposite of a particular affirmative proposition. Although it belongs to the pair of negative affirmative proposition, it still remains different from the universal negative. The particular negative proposition denies something about some members of a class. For instance, if you say “some taxi drivers are not drunk” you are making a particular negative proposition; you are simply denying the attribute of being drunk to some, but not all taxi-drivers.

SELF ASSESSMENT EXERCISE 4

Define and discuss some particular Negative proposition.

4.0 CONCLUSION

This study unit dealt with the different types of propositions. It dealt specifically with what logicians call categorical propositions.

5.0 SUMMARY

In this unit, we introduced you to the different kinds of propositions. The unit focused particularly on categorical propositions. You also learnt about the different types of categorical propositions namely universal affirmative and negative propositions and particular affirmative and negative propositions.

8.0 TUTOR-MARKED ASSIGNMENT

Define and classify categorical propositions.

7.0 REFERENCES/FURTHER READING

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MODULE 4 GENERAL INTRODUCTION

Unit 1	Syllogisms
Unit 2	Symbolising in Logic
Unit 3	Truth Table Analysis
Unit 4	Logical Proofs of Validity Using Truth Tables
Unit 5	Rules of Inference and Argument Forms
Unit 6	Laws of Thought

UNIT 1 SYLLOGISMS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 6.0 Main Content
 - 6.1 Standard Form, Mood, and Figure
 - 6.2 Traditional and Modern Square of Opposition
 - 6.3 Venn Diagrams and Categorical Syllogisms
 - 6.4 Enthymemes and Sorites
 - 6.5 Rules and Evaluating Syllogisms
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the different kinds of syllogisms. It will focus particularly on the categorical syllogism. The unit will also teach you rules for evaluating syllogisms.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- differentiate kinds of syllogisms
- define and discuss standard form, mood and figure of a syllogism
- define and discuss the squares of opposition you know
- define and discuss rules for evaluating syllogisms.

3.0 MAIN CONTENT

To a logician, a syllogism is an argument that contains at least three propositions, two of which are called the premises, and one the conclusion. But you should also keep in mind that there are some syllogisms that contain less or more than three propositions as we shall see later. However, my main focus in this study unit is on the categorical syllogisms. Traditional syllogistic logic or Aristotelian logic deals only with categorical propositions. And, as stated earlier (Unit 4), categorical propositions are indicative or declarative sentences. They assert or deny

relationship between classes. So, always remember that categorical syllogisms are arguments composed entirely of categorical statements. And, every categorical syllogism contains exactly three terms. For instance:

- All men are mortal
- Socrates is a man
- Therefore Socrates is mortal.

3.1 Standard Form, Mood, and Figure

Always keep in mind that the mastery of the above terms is very important for evaluating categorical syllogisms.

Standard Form

Categorical syllogism has a standard form. It is the same everywhere and at any time. It contains some terms proper to it such as Middle term, major term and the minor term. You should remember that the Middle term of a categorical syllogism is the term that occurs once in each premise. The major term of a categorical syllogism is the predicate term of the conclusion. The minor term of a categorical syllogism is the subject term of the conclusion.

We can say that a categorical syllogism is in standard form only and only if the following conditions are met:

- a) The premises and the conclusion must be categorical statements in standard form such as (“All S are P”, “No S are P” “Some S are P” or “Some S are not P”.)
- b) The first premise contains the major term.
- c) The second premise contains the minor term.
- d) The conclusion is stated last.

In other word, in any standard categorical syllogism, the major premise is the premise containing the major term, and the minor premise is the premise containing the minor term, of course, the conclusion is the conclusion.

Mood and Figure

Always keep in your mind that the logical form of a categorical syllogism is determined by its mood and figure, but the mood of a

standard categorical syllogism is determined by the kinds of categorical statements it comprises and the order in which they appear. For instance:

- All psychiatrists are physicians
- Some psychologists are not physicians
- So, some psychologists are not psychiatrists (Layman: 189)

You can see the mood of the above example is AOO. This simply means that the first premise is an A statement, the second premise is an O statement, and conclusion is an O statement. More so, it is also possible for two syllogisms to have the same mood and yet differ in logical form. Logicians use letters in lieu of terms to differentiate between forms. For instance, letter “S” stands for the minor term, “P” for the major term and “M” for middle term.

In any standard categorical syllogism, the figure is specified by the position of the middle term. Logicians classify figures in four categories as follows:

First figure	Second figure	Third figure	Fourth figure
M-P	P-M	M-P	P-M
S-M	S-M	M-S	M-S
So, S-P	So, S-P	So, S-P	So, S-P

You should always remember that the form of a syllogism is completely specified by its mood and figure. There are 256 categorical syllogisms, four kinds of categorical statements, and 64 possible moods. However, nowadays, both ancient and modern logicians agree on the 15 following forms:

First figure:	AAA, EAE, AII, EIO
Second figure:	EAE, AEE, EIO, AOO
Third figure:	IAI, AII, OAO, EIO
Fourth figure:	AEE, IAI, EIO

However, Aristotelian tradition accepts additional nine forms as valid. These are:

First figure	AAI, EAO
Second figure:	AEO, EAO
Third figure:	AAI, EAO
Fourth figure	AEO, EAO, AAI

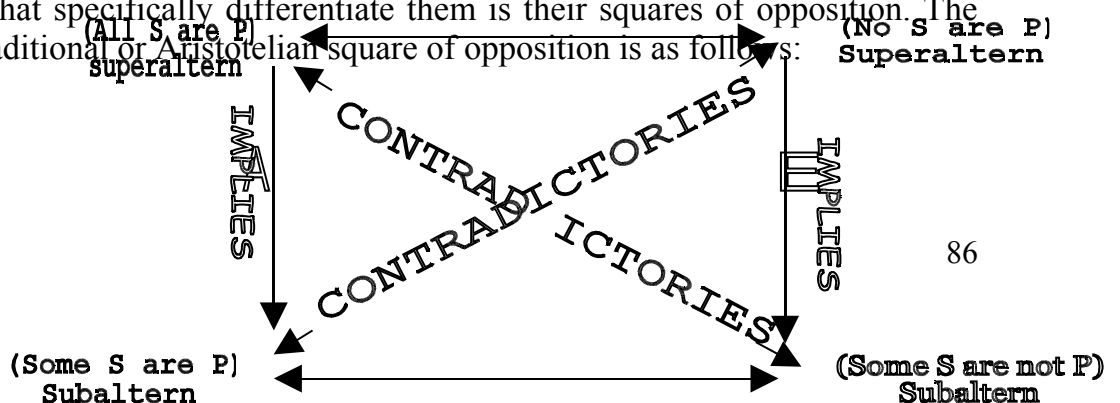
SELF ASSESSMENT EXERCISE 1

- A) Which of the following categorical syllogisms are in standard form?
- (i) Some works of art are books
All novels are books
So, some works of art are novels
 - (ii) All sadists are mean
All art critics are mean
So, all art critics are sadists
- B) Specify the mood and figure of the following forms:
- i) Some P are M ii) No M are P iii) All P are M
All S are M Some M are not S Some S are M
So, Some S are P So, Some S are P So, Some S are P.
- C) Put the following syllogisms into standard form. Then specify the mood and figure. Finally use the list of valid forms to determine whether the syllogisms are valid.
1. Every cowboy loves horses. Not all farmers love horses. It follows that at least one farmer is not a cowboy.
 2. Only good guys are cowboys in white outfits. A thing is a cattle rustler only if it is not a good guy. It follows that no cowboys in white outfits are cattle rustlers.
 3. At least one bronco is not hard to ride, for all bulls are hard to ride, and some Broncos are not bulls.
- D) Write your own syllogisms with forms as specified below. Then use the list of valid forms provided in this section to determine whether the syllogisms are valid.

First figure: EIO 2. Second figure: AEE 3 Third figure: IAI 4. Fourth figure: EAE.

3.2 Traditional and Modern Square of Opposition

As already mentioned, logic is divided into two: the traditional or Aristotelian logic in one hand and the modern logic in another hand. What specifically differentiate them is their squares of opposition. The traditional or Aristotelian square of opposition is as follows:



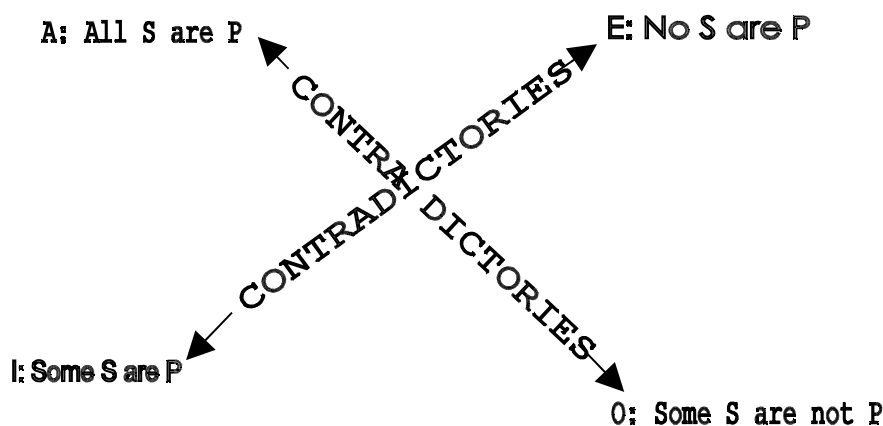
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From the above square of opposition some remarks and discussions can follow. First of all you can see that A and O propositions are contradictories. According to logicians, two propositions/statements are contradictories if they cannot both be true and they cannot both be false. That is, if one is true, the other must be false and vice versa. Similarly, E and I propositions are contradictories as well. Besides, A and E propositions are rather contraries. In logic two propositions/statements are contraries if they cannot both be true but they can both be false. Moreso, I and O propositions are sub-contraries. Again, in logic two statements are sub contraries if they cannot both be false but they can both be true. You should always keep in mind that in logic there is also what is called sub-alternation. This is the logic relationship between a universal statement and its corresponding particular statement. Superaltern stands for the universal statement while subaltern stands for the particular statement.

The Modern Square of Opposition

You should always remember that the modern square of opposition is the result of a reaction to the traditional or Aristotelian logic. It is also called “modern logic” and was championed by 17th and early 20th Century thinkers such as George Boole (1815 -1864), John Venn (1834 – 1923) Charles Sanders Peirce (1839 – 1914) Gottlob Frege (1948 – 1925) and Bertrand Russell (1872 – 1970). Here is the picture of the modern square of opposition.



If you compare the above square with the traditional one, you will find out that the relationships along the sides of the Traditional Square such as Sub-alternation, contraries, and sub contraries have vanished. But according to Layman, the modern approach has at least one advantage over the Aristotelian approach (2002: 216).

SELF ASSESSMENT EXERCISE 1

Logical Relationship

A) Give the names of the logical relations that hold between the following pairs of corresponding categorical statements. If the pair of statements does not exemplify any of the logical relations discussed in this section, simply write “None”.

1. All roses are red flowers/ No roses are red flowers
2. All Apaches are Shawnees/Some Apaches are Shawnees
3. Some radical skeptics are profoundly miserable people/All radical skeptics are profoundly miserable people.
4. Some leaders are followers/some leaders are not followers.

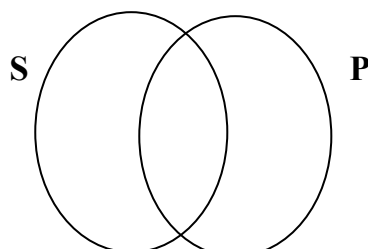
B) Argument forms

Use Venn diagrams to test the following argument forms for validity.

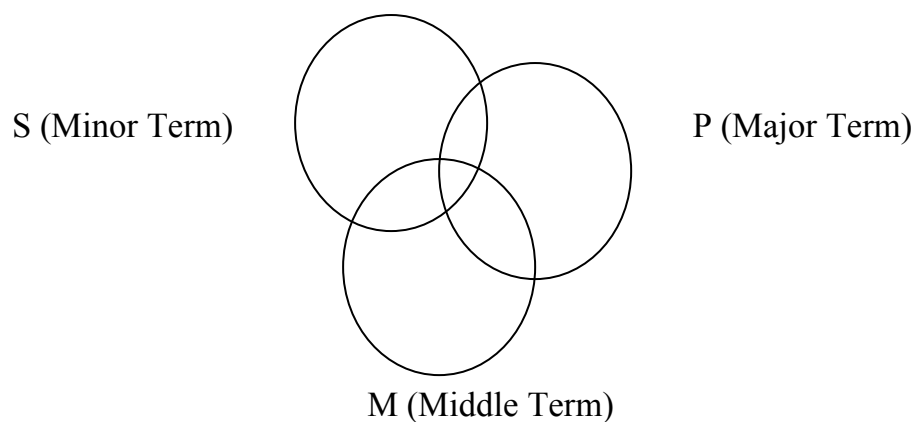
- | | | |
|----------------------|---------------------------|-----------------------|
| 1. No M is P | 2. All M are P | 3. No S is P |
| All S are M | All M are S So, | Some non- P are non S |
| So, Some S are not P | So, at least one M exists | Some S are P |

3.3 Venn Diagrams and Categorical Syllogisms

As stated earlier John Venn (1834 – 1923) is one of the major proponents of modern logic. He is well known for his diagrams. According to him his diagrams ease the checking of the validity of syllogisms. So, since the discovery of the Venn Diagrams, any categorical proposition consisting of only two terms that is, subject and predicate can be represented by the overlapping circles as follows:

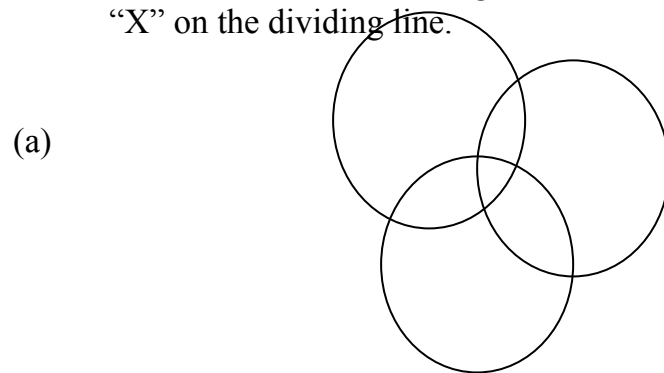


You should always remember that before you apply the Venn method to a categorical syllogism, you must first of all check to see if the syllogism in question is in standard form. If it is, you can then proceed to construct a diagram. If the syllogism is not in standard form, you have to rewrite it. For instance, in a categorical syllogism with three terms that is, the subject, predicate and middle term, the Venn diagram is represented as follows:



From the analysis of Venn diagram, there are some standard techniques for testing the validity of a given syllogism as follows:

1. You must put the argument in its standard form.
2. You must identify the mood and figure of the syllogism.
3. You must translate the mood and figure into standard symbolism.
4. You should also draw the three overlapping circles to represent the information in the syllogistic argument.
5. You should diagram the premises into the circles.
6. You must diagram the universal first.
7. You should diagram the universal premises by shading out the areas representing them in the circles.
8. You should diagram particular premises with an “X” in the areas representing them. Remember that there are two possibilities. (a) You can put an “X” in both possible segments and connect them with a stroke – the floating star of H. Lee, or (b) you can put the “X” on the dividing line.



Use Venn diagrams to determine the validity of the following categorical syllogism.

1. Only Greeks are Athenians. At least one human is not an Athenian. Therefore, not all human are Greeks.
2. Every wicked person is self- deceived, for all liars are wicked and every liar is self – deceived.
3. If anything is a mental event, then it is not a brain event. For only physical events are brain events; and no mental events are physical.

3.4 Enthymemes and Sorites

Enthymemes: in logic, the term enthymeme means an argument or a syllogism with an unstated premise or unstated conclusion. In other word, it is an argument or a syllogism in which only a part of it is expressed. This kind of argument is common both in ordinary discourse and in academic writing. Because the speaker or writer usually presumes some statements already known by the audience and so finds it unnecessary to make these statements explicit. In order to evaluate an enthymeme, the missing premise or conclusion has to be supplied. For example:

- All Nigerians are Africans. Hence Uche is. You can see that in this argument, the major premise and the conclusion are supplied. The minor premises are missing: “Uche is a Nigerian”. So, if you add this statement to the argument, you will have a valid categorical syllogism as follows:
 - All Nigerians are Africans
 - Uche is a Nigerian
 - Therefore, Uche is an African

You should keep in mind that sometimes an acceptable premise or conclusion may be easily supplied and other times it may be difficult to find one that will complete the syllogism and make it valid.

When the conclusion is left unindicated or unstated that argument is called ‘innuendo’. An enthymeme is of the “first order” when the major premise is unexpressed or unstated. It is of the “second order” when the minor premise is unstated or unexpressed. It is of the “third order” when the conclusion is unstated or unexpressed.

SELF ASSESSMENT EXERCISE 3

Identify the missing step in each of the following arguments. Then put the argument into standard form. Finally, use a Venn diagram to check the argument for validity (Layman, 2002: 238 – 240).

1. No certainty should be rejected. So, no self – evident propositions should be rejected.
2. Atoms are indestructible because every simple substance is indestructible.
3. Only scientific statements are rational. It follows that aesthetic judgments are never rational.

B) Sorites

In logic, sorites simply mean a chain arguments or syllogism in which the final conclusion is stated but the sub-conclusions are unstated. Sorites (so-ri-teez) comes from the Greek word soros which stands for “heap” or “pile”. In other word, a sorites is a “heap” of syllogism.

Example: All intellectuals are crazy minds
 No crazy minds are worth listening to
 Some university teachers are intellectuals
 Therefore, some university teachers are not worth listening to. (Otakpor, 2000:120).

The sub-conclusion or the unexpressed statement here is “worth listening to”. So far this sorites to become valid, the unexpressed statement must appear in the major premise. Thus:

- No crazy minds are worth listening to
- All intellectuals are crazy minds
- Therefore, some university teachers are intellectuals.

From the above sorites, you can validly infer that No intellectuals are worth listening to, moreso, you can validly infer as a conclusion that some university teachers are not worth listening to”. Thus, the valid chain of categorical syllogisms will be as follows:

- a) No crazy minds are worth listening to
 All intellectuals are crazy minds
 Therefore, No intellectuals are worth listening to.
- b) Some university teaches are intellectuals
 No intellectuals are worth listening to
 Therefore, some university teachers are not worth listening to.

3.5 Rules for Evaluating Syllogisms

You should always keep in mind that there are some rules one must follow in order to evaluate syllogism. That is, in order to determine valid or invalid arguments. Traditional or Aristotelian logic recognises eight rules while modern logic acknowledges only five. The number does not really matter. What is certain is that you must follow some rules in order to evaluate syllogisms. Again, there is no standard order as far as those rules are concerned (Layman, 2002: 238 – 240).

- Rule one: A valid standard – form categorical syllogism must contain exactly three terms and each term must be used with the same meaning throughout the argument.
- Rule two: In a valid standard form categorical syllogism, the middle term must be distributed in at least one premise.
- Rule three: In a valid standard form categorical syllogism, a term must be distributed in the premises if it is distributed in the conclusion.
- Rule four: In a valid stand form categorical syllogism, the number of negative premises must be equal to the number of negative conclusions.
- Rule five: No valid standard form categorical syllogism with a particular conclusion can have two universal premises.

SELF ASSESSMENT EXERCISE 4

- a) Apply the five rules set above to determine whether the following forms are valid:
1. No P is M. No M are S. So, S is P.
 2. All P are M. All S are M. So, all S are P.
 3. All P are M. Some S are not M. So, some S are not P.

4.0 CONCLUSION

This study unit dealt with the different kinds of syllogisms. The unit also dealt with the rules for evaluating syllogisms.

5.0 SUMMARY

In this study unit, we learnt the different kind of syllogisms, especially the categorical syllogism. Again, we also learnt how to evaluate syllogism, the different kinds of syllogisms, standard form, mood and figure of syllogism, squares of opposition you know and rule for evaluating syllogisms.

6.0 TUTOR-MARKED ASSIGNMENT

Explain and discuss the similarities and dissimilarities between the traditional and modern squares of opposition.

7.0 REFERENCES/FURTHER READING

Layman, C.S. (2000). *The Power of Logic*, (2nd ed.). New York: McGraw – Hill.

Otakpor, N. (2000). *A Preface to Logic*. Benin City: Omone Books.

Uduigwonen, A.F. and G.O. Ozumba. (2000). *A Concise Introduction to Philosophy and Logic*. Calabar: Centaur Publishers.

UNIT 2 SYMBOLIZING IN LOGIC

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 6.0 Main Content
 - 6.1 What is a Symbol?
 - 6.2 Symbolising in Logic
 - 6.3 Symbolising Statements
 - 6.4 Symbolising Variables
- 4.0 Conclusion

- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the definition of symbols and how it happens in logic. It will teach you logicians symbolise statements and variables.

2.0 OBJECTIVES

At the end of the unit, you should be able to:

- define and discuss symbols in logic
- discuss how and why you symbolise some statements in logic
- discuss how and why you symbolise some variables in logic.

7.0 MAIN CONTENT

3.1 What is a Symbol?

In logic, a symbol is a sign or a mark with a particular meaning. However, we have a “sign for something” and a “sign of something” for instance, the sign is a symbol for good. The book on road signs is a wonderful application of “sign for something”. As to a symbol as “sign of something”, your national flag is the best example. Each country has a national flag. And, whenever the flag is found somewhere, it simply means that either the concerned country is present there or has business to do with the place.

SELF ASSESSMENT EXERCISE 1

Use your own word to explain what logicians understand by symbol.

3.2 Symbolising in Logic

To symbolise well in logic, you should take into account the difference between atomic statement and compound statement. An atomic statement is one that does any other statement as a component. Example:

- Heidegger wrote *Being and Time*
- Sartre is an existentialist

- Cameroonians are very gentle

However, a compound statement is one that has at least one atomic statement as a compound example:

- It is not the case that Heidegger wrote *Being and Time*.
- Either Sartre is an existentialist or he is the father of existentialism.
- Nigeria is the most populous country and Sudan is the largest country in Africa.

The symbol system in logic can be summarised as follow.

Operation	Name	Translates	Type of Compound
\sim/\neg	tilde	Not	Negation
\cdot/σ	dot	and	conjunction
\rightarrow/\supset	arrow	if-then	conditional
\leftrightarrow/ \equiv	double arrow	if and only if	bi-conditional

Always remember that the statement before “and” is called the first conjunct while the statement after “and” is called the second conjunct. Moreso, the statement before “or” is called the first disjunct, the statement following “if” is called the antecedent while the statement following “then” is called the consequent. The statement before “if and only if” is called the first part and the statement after “if and only if” is called the second part of the material equivalence.

3.3 Symbolising Statements

The vocabulary of symbolic language consists of parentheses, the logical operators and statement letters. So, any sequence of symbols in this vocabulary is an expression of statement logic. Technically, a grammatically correct symbolic expression is called a well -formed formula (WFF).

You should also keep in mind that any letter of the English alphabet can be used to symbolise a logical statement. But it must be an atomic statement. For instance, a statement such as Heidegger wrote *Being and Time* can be symbolised as Z. In other word, Z can be chosen to symbolise it. Likewise with the second statements. Sartre is an

existentialist. B can be chosen to represent it. However, any other letter from Z and B can be chosen to symbolise the above statements.

A statement is said to be symbolised when any logical symbol is chosen to represent it. If for instance it is letter “Z” then one will say the letter “Z” symbolises the statement. However, always bear in mind that a single letter of the alphabet should never be chosen to represent different atomic statements within the same compound statement. For instance if “Z” symbolises Heidegger wrote *Being and Time* and “B” symbolises Sartre is an existentialist. Then our four compound statements will be as follows:

- a) Our conjunction becomes $Z \cdot B$ or $Z \wedge B$
- b) Our disjunction becomes $Z \vee B$
- c) Our Hypothetical statement or material implication becomes $Z \supset B$ or $Z \rightarrow B$
- d) Our material equivalence become $Z \equiv B$ or $Z \leftrightarrow B$ which simply means Z is materially equivalent to B .

3.4 Symbolising Variables

Something is variable when it is not steady or can change from time to time. This is the case of the letters of the alphabet. Any letter of the alphabet can be chosen to symbolise any logical statement; even if it is a rule that the said letter should be used in a manner that states clearly what it symbolises. For instance:

- a) If “A” symbolises Heidegger wrote *Being and Time*” and “B” symbolises “Sartre is an existentialist” our conjunction becomes $A \cdot B$
- b) If “C” symbolises “Heidegger wrote *Being and Time* and “D” symbolises “Sartre is an existentialist” our conjunction becomes $C \cdot D$.
- c) If “E” symbolises ‘Heidegger wrote *Being and Time*” and “F” symbolises “Sartre is an existentialist” our conjunction becomes $E \cdot F$.

From the above examples, you can see that letters A, B, C, D, E, F are variables. Because they can be chosen to symbolise any logical statement. In other word, their use or meaning varies from time to time depending on the statements they are chosen to symbolise at different times.

However, you should always keep in mind that the logical symbols for “and”, “either ... or”, “if ... then”, “if and only if” cannot change. Therefore they are not variables. They are known to be constant and steady. Whenever you see them in any logical language they always symbolise the same thing. This simply means that the dot sign (.) will always symbolise the English word “and”. This is also true with the vel

(v) sign, the “either ... or”, the “if and only if” and so on. Unlike the letters of the alphabet which are variables, these ones are steady, never varying. That is why they are also called “CONSTANTS”.

You should also remember that despite the fact that any letter of the alphabet can be chosen to symbolise statements in logic the choice usually begins from p, q, r, s, t etc thus these letter beginning from p are customarily called STATEMENT VARIABLES, but this does not mean that other letters are less important or useless. Also remember that we always use small or lower case letters to symbolise statement variables.

4.0 CONCLUSION

This study unit has introduced you the definition of symbols and how it happens in logic.

5.0 SUMMARY

After the mastering of the definition of symbols by logicians, you learnt the different symbols in logic, how and why we symbolise statements in logic, how and why we symbolise variables in logic and the difference between atomic and compound statement.

6.0 TUTOR-MARKED ASSIGNMENT

Define and discuss the different logical symbols.

7.0 REFERENCES/FURTHER READING

Layman, C. S. (2002). *The Power of Logic*, (2nd ed.). New York: McGraw-Hill.

Neneye, E. P. (2003). *Introduction to Logic and Philosophy*. Owerri: Prosperity Publishers.

UNIT 3 TRUTH TABLE ANALYSIS

CONTENTS

- 1.0 Introduction
- 2.0 Objective
- 6.0 Main Content
 - 6.1 Negations
 - 6.2 Conjunctions
 - 6.3 Disjunctions
 - 6.4 Material Conditional
 - 6.5 Material Bi-conditional

- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to how to use truth tables in order to determine the validity or invalidity of a large class of arguments.

2.0 OBJECTIVE

At the end of this unit, you should be able to:

- define how to analyse the five basic logical types of compounds formed via the operators. Namely:
 - the tilde
 - the dot
 - the vee
 - the arrow and
 - the double – arrow.

3.0 MAIN CONTENT

The main focus of this unit is to analyse truth table via what logicians call negations, conjunction, disjunctions, material conditional and material bi-conditional.

3.1 Negations

The truth table of negation can be diagrammed as follows:

P	\sim P
T	F

F T

From the above diagram, you can see that the truth table of negation has two vertical columns, one the left and the one the right. The table also has two horizontal rows. You can see that the column on the left gives you the possible truth values for any statement P , that is, T (true) and F (false). The column on the right gives you the corresponding truth values for the negation, $\sim P$. As for the rows, you can see that in the first (or top) row, P is true, so its negation is false. While in the second (or bottom) row, P is false, so its negation is true.

You should also remember that in logic, a negation has the opposite truth value of the statement negated. If for instance, the statement: “Sartre was born in 1905” is true, therefore its negation “Sartre was not born in 1905” is false. Moreso, if you say that “Heidegger was not born in 1886” is true, then “Heidegger was born in 1886” is false.

3.2 Conjunctions

A truth table of conjunctions can be diagramed as follows:

P	Q	$P \cdot Q$
T	T	T
T	F	F
F	T	F
F	F	F

From the above diagram, you can see that the two columns on the left list contain all the possible truth value assignments for any two statements. For instance, row 1 represents the situation in which both statements are true, while row 2 and 3 represent the two situations in which the statements differ in truth value (P true, Q false; and P false, Q true). Row 4 represents the situation in which both statements are false. Still in the above diagram, the column under the dot indicates that the conjunction as a whole is true only if both conjuncts are true (as in row 1), otherwise, the conjunction as a whole is false.

You can now see that a conjunction is true if both its conjuncts are true; otherwise, it is false. If one conjunct is false the entire conjunction becomes false. For instance, if you say: “Sartre and Heidegger were both born in 1905” the conjunction is false because even if Sartre was born in 1905, Heidegger was not.

3.3 Disjunction

Disjunction can be diagrammed as follows:

P \vee Q	P \vee Q
T T	T
T F	T
F T	T
F F	F

Always remember that a disjunction is false if both its disjuncts are false, otherwise it is true. Consider the following examples:

- a) Either Tony Blair or George Bush was born in 1948 (or both were)
- b) Either Sartre or Heidegger was born in 1905 (or both were)
- c) Either Barack Obama or Hilary Clinton was a Democrat (or both were).

Statement (a) is false because both its disjuncts are false. Statement (b) is true since Sartre was born in 1905. And statement (c) is true because both Obama and Clinton were democrats. From the diagram you can see that the columns on the left represent the four possible combinations of truth values for any two statements and the column under the vee (\vee) indicates that the disjunction is false only when both disjuncts are false, (e.g. in row 4); otherwise, the disjunction as a whole is true.

3.4 Material Conditionals

The material conditional is represented by the arrow (\rightarrow). It is said to be false if its antecedent is true and its consequent is false, otherwise, it is true. Material conditionals can be diagrammed as follows.

P \rightarrow Q	P \rightarrow Q
T T	T
T F	F
F T	T
F F	T

Always remember that the material conditional is false only in the situation in which the antecedent is true and the consequent is false.

3.5 Material Biconditionals

The material biconditional is represented by the double arrow (\leftrightarrow). It is said to be true when its two constituent statements have the same truth value; and, it is said to be false if the two statements differ in truth value. The material biconditional can be diagrammed as follows:

P q	P \leftrightarrow q
T T	T
T F	F
F T	F
F F	T

You should know that the material biconditional is a conjunction of two conditionals.

4.0 CONCLUSION

This study unit dealt with the analysis and interpretation of truth tables. So the analysis or interpretation of the truth table of negations, conjunctions, disjunctions, material conditional and biconditional is very useful to determine the validity or invalidity of a large class of arguments.

5.0 SUMMARY

In this study unit, you were introduced you to the use of truth tables in order to determine the validity or invalidity or a large class of arguments. You learnt how to explain and discuss the truth table analysis of:

- Negation
- Conjunction
- Disjunction
- Material conditional
- Material Bi-conditional

6.0 TUTOR-MARKED ASSIGNMENT

A) True or false? Determine the truth value of the following compound statements. Make the following assumptions:

A is true, B is true, C is false and D is false.

- 1) A .C
- 2) $B \rightarrow D$
- 3) $C \leftrightarrow D$
- 4) $\sim (C \vee D)$
- 5) $(A.C) \rightarrow B$

- 6) $\sim (A \leftrightarrow D)$
- 7) $(A.C) \vee (B.D)$
- 8) $(D \leftrightarrow A) \vee (C \vee B)$

B) More True or False. Determine the truth value of the following compound statements

- 1. It is not the case that Abraham Lincoln was born in 1907
- 2. Hillary Clinton is a married man if and only if Hillary Clinton is a husband.
- 3. It is not the case that both Charlie Chaplin and George Washington are past presidents of the USA
- 4. If Paris is the capital of France, then neither Seattle nor Spokane is the capital of France.

7.0 REFERENCES/FURTHER READING

Layman, C. S. (2002). *The Power of Logic*, (2nd ed.). New York: McGraw-Hill.

Neneye, E. P. (2003). *Introduction to Logic and Philosophy*. Owerri: Prosperity Publishers.

UNIT 4 LOGICAL PROOF OF VALIDITY USING TRUTH TABLES

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 6.0 Main Content
 - 6.1 Modus Ponens
 - 6.2 Modus Tollens
 - 6.3 Hypothetical Syllogism
 - 6.4 Disjunctive Dilemma

- 6.5 Constructive Dilemma
- 6.6 Simplification
- 6.7 Conjunction
- 6.8 Addition
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the analysis of how logicians use Truth Table to prove the validity or invalidity of their cases.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- to analyse the truth Table of:
 - Modus Ponens (MP); Modus Tollens (MT); Hypothetical Syllogism (HS); Disjunctive Syllogism (DS), Constructive Dilemma (CD); Absorption, Simplification and Addition.

3.0 MAIN CONTENT

3.1 Modus Ponens (M.P)

$P \supset Q$
 P
 Q

The truth Table of the Modus Ponens can be diagramed as follows:

P	Q	$P \supset Q$
T	T	T
T	F	F
F	T	T
F	F	T

In the above diagram you can see that the first row is the only substitution instance where the two premises $P \supset Q$ plus P are true and in

that substitution instance, the conclusion, 9, is true, indicating that the argument form is valid.

3.2 Modus Tollens (M.T.)

$$\begin{array}{l}
 P \supset 9 \\
 - 9 \\
 - P
 \end{array}$$

The truth Table of the Modus Tollens can be diagramed as follows:

P	9	-P	-9	$P \supset 9$
T	T	F	F	T
T	F	F	T	F
F	T	T	F	T
F	F	T	T	T

From the above diagram, you can see that fourth row is the only substitution instance where the two premises $P \supset 9$ plus $- 9$ are true and in that substitution instance, the conclusion $-P$ is true, indicating that the argument form valid.

3.5 Hypothetical Syllogism (H.S)

$$\begin{array}{l}
 P \supset 9 \\
 9 \supset r \\
 P \supset r
 \end{array}$$

The truth Table of hypothetical syllogism can be diagramed as follows:

P	9	r	$P \supset 9$	$9 \supset r$	$P \supset r$
T	T	T	T	T	T
T	F	F	F	T	F
F	T	F	T	F	T
F	F	T	T	T	T
F	T	T	T	T	T
T	F	T	F	T	T

T	T	F	T	F	F
F	F	F	T	T	T

From the above diagram you can see that the substitution instances where the premises $P \supset q$ plus $q \supset r$, the first, fourth, fifth and eighth rows are true. And, in all those substitution instances, the conclusion $P \supset r$ is also true. This simply indicates that the argument form Hypothetical Syllogism (H.S) is a valid argument form.

3.4 Disjunctive Syllogism (D.S)

$P \vee q$
 $\neg p$
 q

The Disjunctive Syllogism can be diagrammed as follows:

P	q	$\neg P$	$P \vee q$
T	T	F	T
T	F	F	T
F	T	T	T
F	F	T	F

From the above diagram, you can see that the third row is the only substitution instance where the two premises $P \vee q$ plus $\neg P$ are true. And, you can also notice that in that substitution instance, the conclusion, q is true as well. This simply indicates that the argument form Disjunctive Syllogism is a valid argument form.

3.5 Constructive Dilemma (C.D)

$(P \supset q). (r \supset s)$
 $P \vee r$
 $q \vee s$

P	q	r	s	$p \supset q$	$r \supset s$	$p \vee r$	$q \vee s$	$\supset (p \vee r)$
T	T	T	T	T	T	T	T	T

T	T	F	F	T	T	T	T	T
T	F	T	F	F	F	T	F	F
T	F	F	T	F	T	T	T	F
T	T	F	T	T	T	T	T	T
T	T	T	F	T	F	T	T	F
T	F	T	F	F	T	T	F	F
F	T	F	T	T	T	T	T	T
F	F	T	T	T	T	T	T	T
F	T	T	T	T	T	F	T	T
F	T	F	F	T	F	T	T	F
F	F	F	F	T	T	F	T	T
F	T	T	F	T	F	T	F	F
F	F	F	T	T	T	F	T	T
F	F	F	F	T	T	F	F	T

From the above diagram, you can see that the first, second, sixth and 10th rows are the substitution instances where the premises $(P \supset q)$, $(R \supset S)$ plus $p \vee r$ are both true. You can also see that in all those instances, the conclusion $q \vee s$ is true as well. Thus, indicating that the constructive dilemma is a valid argument form.

3.6 Absorption (Abs)

$P \supset q$
 $P \supset (p \cdot q)$

P	q	$P \supset q$	$P \cdot q$	$P \supset (p \cdot q)$
T	T	T	T	T
T	F	F	F	F
F	T	T	F	T
F	F	T	F	T

Again from the above diagram, you can see that the first, third and fourth rows are the substitution instances where the premise $P \supset q$ is true. And, you can also discover that in all those instances, the conclusion $P \supset q (p \cdot q)$ is true as well thus indicating that the argument form absorption is a valid argument form.

3.7 Simplification (Simp.)

$P \cdot q$
 P

P	q	$p \cdot q$
T	T	T

T	F	F
F	F	F

From the above diagram you can see that the first row is the only substitution instance where the premise $p \cdot q$ is true. And, you can also see that in that substitution instance, the conclusion P is true as well thus indicating that the argument form simplification is a valid form.

3.8 Conjunction (conj.)

P
Q
P.q

P	q	p.q
T	T	T
T	F	F
F	T	F
F	F	F

From the above diagram, you can see that the first row is the only substitution instance where the premises P and q are both true. And, you can see that in that substitution instance, the conclusion $P \cdot q$ is true as well thus indicating that the argument form conjunction is a valid argument form.

3.9 Addition (Add)

P
 $P \vee q$

P	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

From the above diagram, you can see that the first and second rows are the only substitution instances, where the premise P is true. And, you can also see that in those substitution instances, the conclusion $P \vee q$ is true as well thus indicating that the statement form addition is a valid argument form.

You should always keep in mind that whenever you want to use truth table to prove the validity of an argument form, you should always inspect all the instances where the premise or premises are true. During your inspection, if you find out that the conclusion is also true wherever the premises are true, then that argument or argument form is valid. However, if there is any substitution instance at all, where the premises are true but the conclusion is false, then that argument form is invalid. You must always inspect the entire substitution instance before declaring any argument valid or invalid.

4.0 CONCLUSION

This study unit dealt with the logical proof of validity using truth tables. It appears that truth tables analysis is the most appropriate way of proving an argument valid or invalid.

5.0 SUMMARY

In this study unit, you were introduced to the analysis of how logicians use truth tables to prove the validity or invalidity of an argument. You have learnt to analyse the truth table of:

- Modus Ponens (MP)
- Modus Tollens (MT)
- Hypothetical Syllogism (HS)
- Disjunctive Dilemma (CD)
- Absorption
- Simplification and
- Addition

6.0 TUTOR-MARKED ASSIGNMENT

Use your own words to explain some truth tables you know.

7.0 REFERENCES/FURTHER READING

Layman, C. S. (2002). *The Power of Logic*, (2nd ed.). New York: McGraw-Hill.

Neneye, E. P. (2003). *Introduction to Logic and Philosophy*. Owerri: Prosperity Publishers.

UNIT 5 RULES OF INFERENCE AND ARGUMENT FORMS

CONTENTS

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
 - 3.1 Rules of Inference
 - 3.2 Argument Forms
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment

7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to what logicians mean by rules of inference and argument forms.

2.0 OBJECTIVES

At the end of this study unit, you should be able to:

- identify and explain the different rules of inference
- define and discuss the different argument forms.

3.0 MAIN CONTENT**3.1 Rules of Inference**

Most logicians classify rules of inference in nine categories as follows:

1. Modus Ponens (MP)
 - $P \supset q$
 - P
 - Therefore, q
2. Modus Tollens (MT)
 - $P \supset q$
 - $\neg q$
 - Therefore $\neg p$
3. Hypothetical Syllogism (H.S)
 - $P \supset q$
 - $q \supset r$
 - Therefore $p \supset r$
4. Disjunctive Syllogism (D.S)
 - $P \vee q$
 - $\neg p$
 - Therefore q
5. Constructive Dilemma (C.D)
 - $(p \supset q) \cdot (r \supset s)$
 - Therefore $p \vee r$
6. Absorption (Abs)
 - $p \supset q$
 - Therefore $P \supset (p \cdot q)$
7. Simplification (Simp)
 - $P \cdot q$
 - Therefore P
8. Conjunction

- p
q
Therefore p . q
9. Addition (Add.)
p
Therefore P v q

SELF ASSESSMENT EXERCISE 1

For each of the following proofs, indicate from which steps each inference is drawn and by which rule the inference is made.

1. i) $F \longrightarrow G$
ii) $G \longrightarrow H$ therefore $F \longrightarrow H$
2. i) $H \vee \sim C$
ii) $H \longrightarrow \sim B$
iii) $\sim C \longrightarrow B$
iv) $(\sim B \vee D) \longrightarrow (K. J)$ therefore J
v.) $\sim B \vee D$
vi) K.J
vii) J
3. i) $\sim (P. Q) \vee R$
ii) $\sim R$
iii) $E \longrightarrow (P. Q)$
iv) $(\sim E. \sim R) (A. \longrightarrow B)$
Therefore $B \vee (F. G)$
5. $\sim (P.Q)$
6. $\sim E$
7. $\sim E. \sim R$
8. A. B
9. B
10. $B \vee (f. G)$

3.2 Argument Forms

Having defined and discussed what statement and statement forms are all about, you should always remember that an argument form is to arguments what statement form is to statements. Logicians define an argument form as ‘any sequence of symbols containing statement variables but no statements; such that when statements are substituted for the same statement variable throughout, the result is an argument. There is at least one fundamental difference between statement form and argument form. In the statement form and its substitution instances while in that of argument form reference is made to argument form and its substitution instances.

i) Modus Ponens

This is the simplest type of valid argument form that is constructed with hypothetical conditional statements. The argument form of Modus Ponens can be read as follows:

- If this happens, then that will follow
- This happens
- Therefore, that follows.

In a symbolic form, the argument form of Modus Ponens become thus:

- $P \supset q$
- P
- Therefore q

Of course P here represents the antecedent while q represents the Modus Ponens argument form corresponds to the first rule of inference earlier stated. You should also keep in mind that Modus Ponens is any argument that affirms the antecedent of the first premise in the second premise and also affirms the consequent of the first premise in its conclusion. For instance, when we say:

- If all men are mortal, then Bola is mortal
- All men are mortal
- Therefore Bola is mortal

The form of this argument is as follows:

- $P \supset q$
- P
- Therefore q

However, you should bear in mind that any argument form that denies the antecedent is invalid and therefore commits the fallacy of Denying the Antecedent.

ii) Modus Tollens

- $P \supset \neg q$
- $\neg q$
- $\neg P$

From the above you can see that the characteristics of Modus Tollens argument form is that it always denies the consequent. So you should always remember that any argument that denies the consequent of the

first premise, in the second premise, in its conclusion, is of the Modus Tollens form. For instance, when we say:

- If all men are mortal, then Bola is mortal
- Bola is not mortal
- Therefore All Men are not mortal

The form of this argument is as follows:

- $P \supset Q$
- $\neg Q$
- Therefore $\neg P$

iii) Hypothetical Syllogism

- $P \supset Q$
- $Q \supset R$
- Therefore $P \supset R$

What makes Hypothetical Syllogism unique is that the first premise and conclusion have the same antecedent, the second premise and conclusions have the same consequent and the consequent of the first premise is the same as the antecedent of the second premise. So any hypothetical syllogism that follows the above character is a valid one. For instance when we say:

- If Bola is a father then he has children
- If he has children then he has a wife
- Therefore, if Bola is a father then he has a wife

The form of this argument is as follows:

- $P \supset Q$
- Therefore $q \supset r$

iv) Disjunctive Syllogism

- $P \vee q$
- $\neg p$
- Therefore q

As the name says, disjunctive syllogism is that form of argument that has a disjunction as first premise. It is unique in the sense that although

the second premise always denies or contradicts one of the two disjuncts of the first premise, it goes on to validly infer, in the conclusion, that the other disjunct is true. Take the following example:

- Either Tope will cook or Tope will eat in the restaurant.
- Tope will not cook.
- Therefore Tope will eat in the restaurant.

The form of this argument is as follows:

- $P \vee q$
- $\neg p$
- Therefore q

Always remember that in a Disjunctive Syllogism any of the two disjuncts can be negated. And, if the first disjunct for instance is negated; the second become automatically true and vice versa. This is the principle of any Disjunctive Syllogism.

4.0 CONCLUSION

This study unit dealt with the rules of inference and Argument forms. It is clear to you now that logicians acknowledge at least nine standard rules of inference and four argument forms.

5.0 SUMMARY

This study unit introduced you to the most standard rules in inference and argument forms logicians use. You learnt the name and discussed the different logical rules of inference used by logicians and the different argument forms logicians mostly use.

9.0 TUTOR-MARKED ASSIGNMENT

Name and discuss the different rules of inference and argument forms logicians use most.

7.0 REFERENCES/FURTHER READING

Neneye, E. P. (2003). *Introduction to Logic and Philosophy*. Owerri: Prosperity Publishers.

Layman, C. S. (2000). *The Power of Logic*, (2nd ed.). New York: McGraw-Hill.

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UNIT 6 LAWS OF THOUGHT

CONTENTS

- 1.0 Introduction
- 7.0 Objectives
- 3.0 Main Content
 - 7.1 Law of Identity
 - 7.2 Law of Non – Contradiction
 - 3.3 Law of Excluded Middle
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

This study unit introduces you to the laws of thought as laid down by Aristotle. According to the Greek philosopher (Aristotle), these principles or laws can be classified as follows: law of identity, law of Non-contradiction and law of excluded middle.

2.0 OBJECTIVES

At the end of this study unit, you should be able to:

- define and discuss the law of identity
- define and discuss the law non-contradiction
- define and discuss the law of the excluded middle
- identify any similarities or dissimilarities among them.

3.0 MAIN CONTENT

As stated earlier, Aristotle laid down these three principles or laws of thought which are our main concern in this unit. These laws are: 1) law of identity 2) law of Non-contradiction and 3) law of excluded middle.

3.1 The Law of Identity

The law of identity is always stated as follows: “A is A”. Here “A” stands for anything whatever. The originality of this law is that it simply states that anything is what it is. For example “A is A”; “B is B” and “C is C”, everything you say presupposes that thing. For instance, if you speak of a car you are presupposing that ‘a car is a car’. You should also keep in mind that the law of identity “A is A” does not give you specific information concerning the qualities of A: it only tells you that “A is A” that is, whatever “A” happens to be, the thing is itself and nothing else. It does not matter what the “A” is made to represent. The law of identity is always true. Logicians call it a tautological statement because the statement “A is A” is a necessary truth. Moreover, the statement “a car is a car” can never be false.

3.2 The Law of Non-Contradiction

The law of non-contradiction states that nothing can be both A and not A. According to the law, if this is A then it cannot at the same time be – A. For instance, if this is a chalk, it cannot be anything else than a chalk. If this is a house, it cannot be anything else than a house. It must be one or the other. It cannot be both. It must either be A or not A... If it happens to be A and not -A, then it becomes self-contradictory. The

only way to avoid self-contradiction is to obey the law of non-contradiction.

3.3 The Law of Excluded Middle

The law of excluded middle is the third law of thought and it states that everything is either A or not A. As it indicates, the law of excluded middle excludes the middle ground between A and not A. According to the law, everything must choose to be either A or not A. It cannot choose to be neither. For instance, this is either a car or not a car. It cannot be neither a car nor not a car. It must be either a house or not a house. It must be one or the other. According to the law of excluded middle, you cannot refuse to be this and also refuse to be the other.

The overall aim of these laws of thought is to set patterns for anyone who wants to think and speak correctly. Their main duty is to ensure consistent and non – self contradictory thinking speaking and writing. For instance, the law of identity tells you that a thing is what it is and nothing else. The law of non-contradiction tells you that a thing must be one thing or another thing. It cannot be that very thing and be another thing at the same time. The law of excluded middle tells you that a thing must be one thing or not that very thing. It cannot be neither that very thing nor not that very thing. It cannot be neither that very thing or not that very thing. It must be one or the other. These laws of thought are very important because they are presupposed in all our speech whenever we speak about anything.

4.0 CONCLUSION

This study unit dealt with different laws of thought. There are generally three standard laws of thought laid down by the Greek philosopher Aristotle (384 – 322 BC). These laws are:

- 1) The law of identity
- 2) The law of non – contradiction
- 3) The law of excluded middle.

5.0 SUMMARY

In this study unit, you have been introduced to the standard laws of thought that logicians mostly use. You have learnt to define and discuss

with an example the law of identity, the law of Non – contradiction and the law of excluded middle.

6.0 TUTOR-MARKED ASSIGNMENT

In your own words, discuss the three laws of thought laid down by Aristotle.

7.0 REFERENCES/FURTHER READING

Neneye, E. P. (2003). *Introduction to Logic and Philosophy*. Owerri: Prosperity Publishers.

Otakpor, N. (2000). *A Preface to Logic*. Benin City: Omone Books.