LOGIC AND CRITICAL THINGING
COURSE CODE: PHIL 1011

Course Instructor Minda W.

College of Social Science and Humanities
Arba Minch University
October, 2019

Chapter TWO
basic concept of logic

CONTENTS

- **Basic concepts of logic**
  - ✓ Arguments, premise and conclusion
- **Techniques of recognizing arguments**
  - ✓ Recognizing argumentative passages
  - ✓ Recognizing non-argumentative passages
- **Types of Arguments**: Deductive and Inductive Arguments
- **Evaluating arguments:**
  - ✓ Evaluating Deductive Arguments; Validity, Truth and Soundness
  - ✓ Evaluating Inductive Arguments; Strength , Weakness and cogency

Chapter Objectives:

- ***Dear students,*** **after the successful completion of this chapter, you will be able to:**
  - **Understand the meaning and basic concepts of logic;**
  - **Understand the meaning, components, and types of arguments; and**
  - **Recognize the major techniques of recognizing and evaluating arguments.**

Meaning of Logic

Logic is

- **It is an organized body of knowledge, or science that evaluates arguments.**

Aim of logic

- ✓ To develop a system of methods and principles that used for evaluating the arguments of others;
- ✓ Guides in constructing arguments of our own.
- ❖ Logic is the study of the methods and principles which are used to distinguish Good (correct) from bad (incorrect) arguments.
- ❖ The study of logic is one of the best ways to refine one's natural ability to reason and argue.

Importance of Learning Logic

- ✓ ***Logic sharpens and refines our natural gifts to think, reason and argue.(C. S. Layman).***
- ✓ **To develop the skill to construct sound (good) and fallacy-free arguments of one‘s own and to evaluate the arguments of others;**
- ✓ **To defend prejudiced and uncivilized attitudes that oppose a civilized and democratic society;**
- ✓ **To identify the common logical errors in reasoning;**
- ✓ **To disclose ill-conceived policies in the political sphere**

Argument

It is a systematic combination of two or more statements(premise or premises and conclusion).

- **A premise (which can be one or more than one) is a statement, which provides reason or support for the conclusion, and conclusion is one.**
- ***A conclusion* is a statement, which is claimed to follow from the given evidence (premise).**

✓ ***An argument is a group of statements.***

✓ **A *statement* is a declarative sentence that has a truth-value of either true or false.**

✓ **Truth and falsity are the two possible truth-values of a**

Cont.

A) ***Dr. Abiy Ahmed the current Prime Minister of Ethiopia.***

B) Mekelle is the capital city of Tigray Region.

C) Ethiopia was colonized by Germany.

<u>NB.</u> A and B are true and truth is their truth value.

C is false and falsity is its truth value.

- **In this chapter, the term statement is used to refer premises and a conclusion.**

❖**There are sentences that are not statements.**

Examples

- ***Would you close the window? (Question)***
- ***b) Let us study together. (Proposal)***
- ***c) Right on! (Exclamation)***
- ***d) I suggest that you read philosophy texts. (Suggestion)***
- ***e) Give me your ID Card, Now! (Command).***

➢ **None of the above sentences can be either true or false. Hence, none of them can be classified as statement. As a result, none of them can make up an argument.**

Cont'd

❖ **Constructing arguments;**

❑ ***Example-1***

- ***All Ethiopians are Africans. (Premise 1)***
- ***Tsionawit is Ethiopian. (Premise2)***
- ***Therefore, Tsionawit is African. (Conclusion)***

❑ ***Example-2***

- ***Some Africans are black. (Premise-1)***
- ***Zelalem is an African. (Premise-2)***
- ***Therefore, Zelalem is black. (Conclusion)***

- ***Distinguishing premises from conclusion and vice versa:***

The first technique that can be used to identify premises from a conclusion and vice versa is *looking at an indicator word*.

Some Conclusion Indicators:

Therefore	***Entails that***	***It must be that***
Wherefore	***Accordingly***	***We may conclude***
Provided that	***It shows that***	***Hence***

Cont.

Women are mammals.

Zenebech is a woman.

There fore, Zenebech is a mammal.

Some typical Premise Indicators:

- ***Since***
- ***As indicated by***
- ***Because***
- ***Owing to***
- ***Seeing that***
- ***Given that***
- ***As***
- ***For***
- ***In that***
- ***May be inferred from***
- ***In as much as***
- ***For the reason that***

Example:

- ***You should avoid any form of cheating on exams because cheating on exams is punishable by the Senate Legislation of the University.***
- **Sometimes you may found an argument that contains no indicator all; *neither a conclusion indicator word nor a premise indicator word*.**

❖ **When this happens, the reader/ listener must ask himself or herself such questions as:**

❑ **What single statement is claimed (implicitly) to follow from the others?**

❑ **What is the arguer trying to prove?**

- **The answers to these questions should point to the conclusion.**

Our country should increase the quality and quantity of its military. Ethnic conflicts are recently intensified; boarder conflicts are escalating; international terrorist activities are increasing. *(there is no indicator words).* **The main point of this argument is to show that the country should increase the size and quality of its military.**

The following is the standard form of this argument:

- ***Ethnic conflicts are recently intensified. (P-1)***
- ***Boarder conflicts are escalating. (P-2)***
- ***International terrorist activities are increasing. (P-3)***

Cont.

- **Depending on the logical and real ability of the premise(s) to support the conclusion, an argument can be either a good argument or a bad argument.**
- **Arguments where the premise really supports the conclusion are good arguments and those which are on the contrary are bad arguments.**
- **Arguments can generally be divided into deductive and inductive arguments.**

A deductive argument can be evaluated by its validity and soundness, where as an inductive argument can be evaluated by its strength and cogency.

Techniques of Recognizing Arguments

- **An argument is a systematic combination of one or more than one statements.**
- **However, not all passages that contain two or more statements are argumentative.**
- **There are various passages that contain two or more statements but are not argumentative.**
- **We will see the techniques of distinguishing argumentative passages from non-argumentative passages.**

Recognizing Argumentative Passages

- **A passage contains an argument if it purports to prove something; if it does not do so, it does not contain an argument.**

Two conditions must be fulfilled for a passage to purport to prove something:

- ✓ ***At least one of the statements must claim to present evidence or reasons.***
- ✓ ***There must be a claim that the alleged evidence or reasons supports***

- **In arguments premises must claim to present evidence or reasons, and there must be a claim that the evidence or reasons support or imply something.**

Cont.

Claims may be factual or inferential claim

- **The inferential claim is simply the claim that the passage expresses a certain kind of reasoning process- that something supports or implies something.**
- **It is an objective feature of an argument grounded in its language or structure. It can be either *explicit* or *implicit*.**

An *Explicit inferential claim* is usually asserted by premise or conclusion indicator words (thus, since, because, hence, therefore, and so on).

Example: *Gamachuu is my biological father, because my mother told so.*

In this example, the premise indicator word because expresses

Cont.

- An ***implicit inferential claim*** **is an inferential relationship between the statements in a passage, but the passage contains no indicator words.**

Example:

The genetic modification of food is risky business. Genetic engineering can introduce unintended changes into the DNA of the food-producing organism, and these changes can be toxic to the consumer.

NB. ***The mere occurrence of an indicator word by no means guarantees the presence of an argument.***

Cont.

- **The presence of an indicator word does not mean that the existing indicator word actually and always indicate a premises or a conclusions.**
- **Thus, before deciding that an indicator word indicates a premises or a conclusion, make sure that the existing indicator word is used to indicate a premise or a conclusion.**
- **Examples:**

A. Since Edison invented the photograph, there have been many technological developments.

B. Since Edison invented the photograph, he deserves credit for a major technological development.

Cont.

In the passage 'A' the word 'since' is used in a temporal sense. It means from the time that.'' Thus, the first passage is not an argument.

In the passage 'B' the word 'since' is used in a logical sense, and so the passage is an argument.

Recognizing Non-argumentative Passages

- **Non-argumentative passages are passages, which lack an inferential claim.**
- **These include simple non-inferential passages, expository passages, illustrations, explanations, and conditional statements.**
- **For a passage to be an argument, it not only should**

Some of the most important forms of non-argumentative passages.

1. Simple Non-inferential Passages **(**warnings, pieces of advice, statements of belief or opinion, loosely associated statements, and reports. **)**

2. *Expository Passages…*mostly, its objective is not to prove the topic sentence but only to expand it or elaborate it.

3. *Illustrations is an* expression involving one or more examples *to show how some thing done.*

***4. Explanations* - It attempts to clarify, or describe such alike why something is happen .**

5. *Conditional Statements* (is an if . . . Then . . . statement).

Example:

If you study hard, then you will score "A" grade.

- **Some time, the conditional statement can be re-expressed to form an argument. Example:-**

✓ ***If destroying a political competitor gives you joy, then you have a low sense of morality . (Conditional sentence).***

✓ ***Destroying a political competitor gives you joy. Therefore, you have a low sense of morality. (Argument)***

- **Generally, in deciding whether a passage contains an argument, you should look for three things:**
- ***1) indicator words such as “therefore,” “since,” “because,” and so on;***
- ***2) an inferential relationship between the statements; and***
- ***3) typical kinds of non-arguments.***

- ***But remember that the mere occurrence of an indicator word does not guarantee the presence of an argument.***

Types of Arguments

Deductive Arguments

- **The reasoning process (inference) that an argument involves is expressed either with certainty or with probability implies *deduction* and *induction* respectively.**
- **It is an argument incorporating the claim that it is impossible for the conclusion to be false given that the premises are true.**
- **Its conclusion is claimed to follow with strict certainty or necessity**
- **Use special indicator words like *certainly, necessarily, absolutely, definitely…***

Example 1

All human beings are mortal.
Mr. X is a human being.
Therefore, Mr. X is Mortal

Inductive Arguments

- **An argument incorporating the claim that it is improbable for the conclusion to be false given that the premises are true.**
- **The conclusion is claimed to follow only probably from the premises.**
- **The premises may provide some considerable evidence for the conclusion but they do not necessarily support the conclusion.**

Cont.

- **Sufficient condition (evidence) but we cannot be certain about the truth of the conclusion. However, this does not mean that the conclusion is wrong or unacceptable.**
- **Inductive argument use indicator words like *probable, improbable, plausible, implausible, likely, unlikely, and reasonable to conclude.***

Example-1:

Most African leaders are blacks.

Mandela was an African leader.

Therefore, probably Mandela was black.

- **In the above e.g., the conclusion does not follow from the premises with strict necessity, but it does follow with some degree of probability**

Differentiating Deductive and Inductive Arguments

As we have seen in beginning, **there are three factors that influence the decision about the deductiveness or inductiveness of an argument‘s inferential claim.**

A, The occurrence of special indicator words,

B, The actual strength of the inferential relationship between premises and conclusion, and

C, The character or form of argumentation the arguers use.

Deductive Argumentative Forms

The ff arguments have a distinctive character or form that indicates that the premises are supposed to provide absolute support for the conclusion.

1. **Mathematical arguments are arguments depend on some arithmetic and geometric backgrounds.**

For Example:

You can put two orange and three bananas in a bag and conclude that the bag contains five fruits

Statistical argument are inductive since they are characterized by probabilistic or sampling procedures to arrive at a conclusion.

Cont.

Syllogisms **are arguments consisting of exactly two premises and one conclusion. Syllogisms can be categorized into three groups.**

2. Categorical syllogism: a syllogism is an argument consisting of exactly two premises and one conclusion.

Categorical syllogism is a syllogism in which the statement begins with one of the words *all*, *no* and *some*.

Example:

All Egyptians are Muslims.

No Muslim is a Christian.

Hence, no Egyptian is a Christian.

Cont.

3. Hypothetical syllogism: It is a syllogism having a conditional statement for one or both of its premises.

Example:

- *If our body temperature is beyond the normal condition (37^{o}C), then we are not in a normal state of mind. If we are not in normal state of mind, then we would not cope up with any physical as well as mental challenges. Therefore, if our body temperature is beyond the normal condition (37^{o}C), then we would not cope up with any physical as well as mental challenges.*

4. Disjunctive syllogism: it is a syllogism having a disjunctive statement. (I.e. an either … or statement.)

Cont.

Example of disjunctive syllogism:

Rewina is either Ethiopian or Eritrean.

Rewina is not Eritrean.

Therefore, Rewina is Ethiopian

5. An argument from definition is a deductive argument form since the premises already define the truth of the conclusion.

Examples-*1.*

God is omniscient, it follows that He knows everything.

Example-2.

All animals are mammals.

All mammals are Living things.

Therefore, all animals are living things.

Inductive form of Arguments

Inductive argument is when content of the conclusion is in some way intended to go beyond the content of the premises.

1. Prediction is an argument when somebody concludes about the future based on what was or is happening before as well as now.

- **In a prediction the premises deals with some known event in the present or the past and the conclusions moves beyond this event to some event to relative future.**
- **This is an inductive argument in the sense that it cannot show the future with certainty.**

Example

It has been raining for the whole day of this week. This shows that it will rain for the coming weak.

Cont.

2. An argument from analogy: **It is an argument that depends on the existence of an analogy or similarity between two things or state of affairs.**

Existence of this analogy/similarity a certain conditions that affects the better- known thing or situations is concluded to affect the less familiar , lesser known-thing or situation.

For instance, one may conclude, after observing the similar features of ***Computer A and Computer B; that both are manufactured in 2012; that both are easy to access; that Computer A is fast in processing; it follows that Computer B is also fast in processing.***

3. *An inductive generalization*: it is an argument that proceeds from the knowledge of a selected sample to some claim about the whole group.

- **Sample members characteristics = all members of the group characteristics**

Cont.

***4. An argument from authority*: it is an argument in which the conclusions rest upon a statement made by some presumed authority or witness.**

5. *Arguments based on sign*: it is an argument that proceeds from the knowledge of a certain sign to the knowledge of a thing or situation that the sign symbolizes.

For instance, by observing "No Parking" sign posted on the side of a road, the area is not allowed for parking.

6. *A causal inference*: it is an argument which proceed from the knowledge of a cause to the knowledge of an effect or vice versa.

Examples

Kebede is upset so that he is silent. *Cause to effect*

The meat is dry so that it had been over cooked. *Effect to cause*

Evaluating Arguments

Evaluating Deductive Arguments

- **Four terms of evaluating deductive arguments: *Valid, Invalid, Sound, and Unsound.***
- **Deductive argument can be divided into two forms: Valid and invalid.**

A valid deductive argument is an argument such that if the premises are assumed to be true, the conclusion must be true (it is impossible for the conclusion to be false). OR

The logical connection between the premises and the conclusion of a valid deductive argument is a matter of strict necessity, and if the case is to the opposite, the argument is invalid.

END OF CHAPTER TWO

