

Logic and Argumentation

All UG Programs

Course Category: Minor

Schedule of Offering: 2nd Semester

Course Credit Structure: 3

Contact Hours per week: 3 Hours per week

- **Lecture: 3**
- **Tutorial: 0**
- **Practical: 0**

Course Instructors: R. Venkata Raghavan and K.E. Gopala Desikan

1. Introduction

The ability, on the one hand, to set out our own thoughts clearly, coherently, and persuasively and, on the other hand, to scrutinize arguments offered by others is a necessary skill in academics. Arguments are means by which we demonstrate our reasoning and justify our beliefs. Logically, every argument is an inference - deductive, inductive or otherwise. All inferences involve arriving, step by step, from what we know (or what is already accepted) to what we don't know or what we want to prove. The course has two major focus areas: the nature of inference and the fallacies therein. We shall be looking at two traditions: the Modern Western and the Classical Indian (mainly from the Nyāya perspective). From the former, we will learn some fundamental concepts in sentential logic and from the latter the basics of Indian theory of inference (anumāna). The second area i.e. fallacies (formal and informal) will also be studied from both perspectives. At the end of this course, the student should be able to set out their own arguments with clarity and draw out arguments from other works and evaluate them for their strengths and weaknesses.

2. Course Objectives

- To understand the nature and types of inference.
- To familiarize oneself with some common fallacies in reasoning
- Acquiring the skill to analyze an argument in term of certain formal and informal parameters

3. Pre-requisites

None.

4. Readings

1. Copi, Cohen and McMahon, **Introduction to Logic**, 14th Edition, Pearson India, 2015. This will be used as the primary textbook for this course for Western Logic. (Hereafter referred to as Copi & Cohen)
2. Kuppuswami Sastri S., **A Primer of Indian Logic**, 2nd Edition, The Kuppuswami Sastri Research Institute, 1951. This will be used as the primary textbook for this course for the concepts in Indian Logic.
3. Merrie Bergmann, James Moor and Jack Nelson, **The Logic Book**, McGraw-Hill Education, 2013. For exercises/problems.

5. Module-wise topics

This course is divided into 6 modules. Practise classes have been added at appropriate junctures to ensure a better understanding of the concepts.

1. Introduction: What is Logic? (4 sessions)

This is the introductory module wherein, we see what is the relationship between logic, inference, and argumentation. We will briefly see the historical development of Logic in the Western tradition, starting from Greek logic to modern symbolic logic of the 20th century. Similarly, in the Indian context, the evolution of Logic (nyāya) as a separate darsana.

Topics:

- Logic in Indian Philosophical perspective (2 sessions)
- Western Logic: An Introduction (2 sessions)

Readings:

- A. Copi & Cohen, pp. 2-17
- B. Matilal, Introducing Indian Logic, in *The Character of Logic in India*, Ganeri and Tiwari (eds.), SUNY Press, 1998, pp. 14-18.

2. Types of Inference (8 Sessions)

Reasoning takes various forms. Consequently, the logical form of the inference involved also varies. In this module, we shall learn to identify some of the most common inference patterns.

Topics:

- Based on its logical form: Deductive, Inductive, Inference to Best explanation and Analogy (4 sessions)
- Based on its purpose: Inference for self and Inference for others, Rhetorical (including chala, vitaṇḍa, and jāti) and Rational inference (2 sessions)

Readings:

- A. Kuppuswami Sastri S., Part III, Chapter II in **A Primer of Indian Logic**, 2nd Edition, The Kuppuswami Sastri Research Institute, 1951, pp 215 - 220.
- B. Copi & Cohen, pp. 18-26

C. Roy Perrett, **An Introduction to Indian Philosophy**, Cambridge University Press, 2016. pp. 85-91

3. The basic structure of a Rational Inference (10 sessions)

This is one of the two central modules of the course. We shall learn the structure and components of inference as set out in the two traditions.

Topics:

- Indian Epistemology and the role of inference (1 session)
- Basic structure of Inference in Indian philosophy (2 sessions)
 - Sādhya, Hetu and Pakṣa
 - Vyāpti and its types
- Indian Model of Debate (1 session)
- Basic concepts of Sentential Logic (2 sessions)
 - Logical Connectives
 - Some valid forms of inference: Modus Tollens, Modus Ponens, Hypothetical Syllogism, Disjunctive Syllogism.
- Logical properties of an inference: Validity, Soundness and Convincingness (1 session)

Readings:

- A. Kuppuswami Sastri S., Part III, Chapter II in **A Primer of Indian Logic**, 2nd Edition, The Kuppuswami Sastri Research Institute, 1951, pp 188 - 197, 198 - 203, 220 - 232.
- B. Copi & Cohen, pp. 27-32, 305-331, 334-339
- C. Roy Perrett, **An Introduction to Indian Philosophy**, Cambridge University Press, 2016. pp. 49-52

4. Evaluating an Inference (9 sessions)

What constitutes a good inference or a convincing argument? How to test whether the components of the argument support the conclusion *in the right way*? This will be focus of this module.

Topics:

- Components that determine a valid inference: Indian Perspective (2 sessions)
- Formal methods: Casting arguments into one of the valid forms (1 session)
- Informal methods: Paraphrasing and Diagramming (2 session)

Readings:

- A. Kuppuswami Sastri S., Part III, Chapter II in **A Primer of Indian Logic**, 2nd Edition, The Kuppuswami Sastri Research Institute, 1951, pp. 203 - 207, 215 - 218, 221 - 223, 232 - 234.
- B. Copi & Cohen, pp. 36-45

5. How not to argue (10 sessions)

This the other central module of the course. To know what are the

common errors committed in reasoning, identifying them in a given argument and most importantly trying to avoid them in one's own reasoning will be the aim of this module.

Topics:

- Fallacies that make an inference invalid (1 session)
- Fallacies that make the components of inference invalid (2 sessions)
- Formal fallacies(1 session)
- Informal fallacies and Nigrahasthāna (3 sessions)

Readings:

- A. Kuppuswami Sastri S., Part III, Chapter II in **A Primer of Indian Logic**, 2nd Edition, The Kuppuswami Sastri Research Institute, 1951, pp 235 - 247.
- B. Copi & Cohen, selections from Chapter 4 (Fallacies).
- C. Roy Perrett, **An Introduction to Indian Philosophy**, Cambridge University Press, 2016. pp. 80-82
- D. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjBqKSl_nHTAhXFuI8KHd3GBD4QFggmMAA&url=http%3A%2F%2Flink.springer.com%2Fcontent%2Fpdf%2F10.1007%252Fs10781-009-9083-y.pdf&usg=AFQjCNGBZNYEZCGNYsOUsdUhtSBmphHxXw&sig2=IuvOp4qd7YOHY3O9rEb0qA pp. 56 - 72 last accessed on 12th May 2017

6. Arguments in different fields (4 sessions)

Module 2 focused on classification of arguments based on their logical form and purpose. However, arguments can vary depending on the discipline in which they are made (though the fundamental principles may be uniform). In this module, we will see how various disciplines, by their nature, favour (or allow) certain forms of reasoning and avoid (and disallow) some forms of inference.

Topics:

- Arguments in Science: An overview (1 session)
- Argument in Social Sciences: An overview (1 session)
- Arguments in Philosophy: An overview (1 session)
- Legal Arguments: An overview (1 session)

Readings:

- A. Stephen Toulmin, Richard Rieke and Allan Janik, **An introduction to reasoning**, Macmillan publishing co., 1984, Part 6, pp. 271-280

6. Pedagogy

Argumentation is a skill and to acquire it one needs practise. Thus, after some conceptual tools are given as part of lecture, there will be practise classes to see how the tools are used effectively. We will take actual arguments from various disciplines, media, popular internet forums so that students have first hand

experience of how helpful these tools are. The student is expected to participate actively in class.

7. Evaluation Pattern

Following is the evaluation pattern for this course

- End-sem exam: 40%
- Mid-sem exam: 30%
- Assignments: 20%
- Debate: 10%