



## CURRICULUM FOR THE FOUR-YEAR UNDERGRADUATE PROGRAMME UNDER THE NEW EDUCATION POLICY

**Course Outcome:** Upon successful completion of the course, students will have a solid understanding of the principles and concepts of Aristotelian Logic, and will have developed advanced critical thinking skills necessary for evaluating the logical structure of arguments. They will be adept at identifying fallacies, constructing valid reasoning, and assessing the validity of arguments based on Aristotelian logical principles. Moreover, students will possess the necessary knowledge and skills to pursue advance logical studies in the fields of symbolic logic, informal logic, philosophical logic, and the like.

### **Suggested Readings:**

1. Copi, I.M., Introduction to Logic (Latest Edition). Routledge, London
2. Cohen and Nagal, Logic and Scientific Method.
3. Baronett. S and Sen, M., Logic, Pearson, Delhi.
4. Copi, I.M., Symbolic Logic (Latest Edition)

### **SEMESTER-II**

### **PHISEC151T**

### **LOGIC II (MODERN LOGIC)**

**Contact Hours: 45**

**Full Marks = 100 [ESE (70)/CCA (30)]**

**Course Objectives:** This course is an advanced course designed to delve deeper into the concepts, principles, and applications of modern symbolic logic. The core objectives of studying this course are:

- i. To provide students with a comprehensive understanding of advanced logical systems, such as, predicate logic, and the knowledge of translating and analyzing complex arguments using these formal systems.
- ii. To develop advanced proof techniques, including decision procedures, such as, Truth-Table, Shorter Truth-Table, Natural Deduction (Direct, Indirect, Conditional), etc.
- iii. To enhance students' critical thinking abilities by enabling them to recognize fallacies, evaluate deductive and inductive reasoning, and identifying logical inconsistencies.
- iv. To explore the practical applications of Logic in various disciplines, such as, Mathematics, Philosophical Logic, etc., and highlight how Logic plays a fundamental role in these fields, and how it can be applied to real-world scenarios.



## CURRICULUM FOR THE FOUR-YEAR UNDERGRADUATE PROGRAMME UNDER THE NEW EDUCATION POLICY

### UNIT I

Special Symbols : Variables and Constant, Symbolization, Five Basic Truth-Functions.

Decision Procedure : Testing of Validity/Invalidity by Truth-Table Method

### UNIT II

Formal Proof of Validity : Nineteen Rules (Direct, Indirect and Conditional)

### UNIT III

Proving Invalidity : Shorter Truth-Table Method, Indirect Method.

### UNIT IV

Quantification : Symbolization, Proof Construction.

### UNIT V

Science and Hypothesis; Probability (Theories of Addition and Multiplication and their Joint Application).

**Course Outcome:** Upon successful completion of this course, students will be able to analyse complex arguments, identify fallacies, and assess the validity and soundness of deductive and inductive reasoning. Students will have gained expertise in various proof techniques, such as, natural deduction, truth-table techniques, probability calculation, etc. Overall, this course will equip students with advanced logical reasoning skills, critical thinking abilities, and a deep understanding of modern symbolic logic.

### Suggested Readings:

1. I.M. Copi and Cohen, An Introduction to Logic, Macmillan
2. I.M. Copi, Symbolic Logic, Macmillan
3. Patrick Suppes, Introduction to Logic
4. W.V. Quine, Methods of Logic, Harvard University Press
5. Richard Jeffrey, Formal Logic: Its Scope and Limits
6. W. Kneale, Probability and Induction. Clarendon Press