



**SYMBIOSIS**

# Symbiosis College of Arts and Commerce

(An Autonomous College under Savitribai Phule Pune University)

## INTERDISCIPLINARY COURSE FOR 'DEGREE WITH HONOURS' PROGRAMME

**Title of the Course: Basic Logic**

**No. of Hours: 45**

**Course Code: 40310I16**

**Faculty: Mr Pramod Shinde**

### Objectives and Learning Outcome

- CO 1: Read and create an awareness about basic logic.
- CO 2: Explain the basic operators used in logic and use them to check the validity of an argument.
- CO 3: Solve puzzles using logical connectives.
- CO 4: Explain the basic concepts in set theory and relate it with mathematical logic.
- CO 5: Test the knowledge and understanding of basic logic & the ability to solve puzzles and simple theories.

### Teaching Methodology:

Concepts will be build by discussions in the class room with students. Students will be encouraged to give examples and relate those examples with the theory. As there will be sessions on solving puzzles; the sessions will be highly interactive.

Unit	Contents of the syllabus	Number of Hours
1.	<b>Propositional Logic</b> <ul style="list-style-type: none"> <li>• Introduction to Logic, Converse, Contrapositive, Inverse, Precedence of Logical Operators, Propositional Equivalences and Logical Equivalences</li> </ul>	7
2.	<b>Predicates and Quantifiers</b> <ul style="list-style-type: none"> <li>• Predicates, Quantifiers, the Universal Quantifier, the Existential Quantifier, Quantifiers with Restricted Domains, Precedence of Quantifiers and Binding Variables, Logical Equivalences Involving Quantifiers, Nested Quantifiers, the Order of Quantifiers, Translating Mathematical Statements, Translating from Nested Quantifiers into English, Translating English Sentences into Logical Expressions and Negating Nested Quantifiers.</li> </ul>	7
3.	<b>Methods of Proofs</b> <ul style="list-style-type: none"> <li>• Rules of Inference for Propositional Logic, Rules of Inference for</li> </ul>	12

	Quantified Statements, Introduction to Proofs and Methods of Proving Theorem.	
<b>4.</b>	<b>Introduction to Basic Set Theory</b> <ul style="list-style-type: none"> <li>• Cantor's Concept of a Set, Operations for Sets, Counting Elements in a Set.</li> </ul>	<b>9</b>
<b>5.</b>	<b>Research Work: Guest lectures, Excercises</b>	<b>10</b>
	<b>Total Number of Hours</b>	<b>45</b>
<b>Suggested Reference Books</b>		
<ol style="list-style-type: none"> <li>1 <i>Discrete Mathematics and Its Applications</i>, Kenneth H. Rosen, Seventh Edition, McGraw Hill.(2012) Sections: 1.1 to 1.6.</li> <li>2 <i>Set Theory and Logic</i>, Robert R. Stoll, Dover Publications, Inc.(1979)</li> </ol>		
<b>Additional reading:</b>		
<i>Discrete Mathematical Structures</i> , Bernard Kolman, Robert C. Busby, Sharon Cutler Ross and Nadeem-ur-Rehman, Fifth Edition, Pearson Education, Inc., 2004.		