



**Savitribai Phule Pune University**

(Formerly University of Pune)

**Revised Syllabus for**

**SYBA Logic**

[Semester III & IV]

**NEP 2020**

**To be implemented from Academic Year 2025-26**

## **COURSE STRUCTURE**

[UG Degree, Year-2]

(w.e.f. academic year 2025-26)

### **DSC - LOGIC**

| <b>Level/<br/>Year/<br/>Sem.</b> | <b>Course<br/>Type</b> | <b>Course Code</b> | <b>Course Title</b>                         | <b>Credit</b> | <b>Theory /<br/>Practical</b> |
|----------------------------------|------------------------|--------------------|---|---------------|-------------------------------|
| L-5.0<br>Year-II<br>Sem. III     | MNT                    | LOG -201- MNT      | Propositional Logic                         | 02            | Theory                        |
|                                  | MNP                    | LOG -202- MNP      | Propositional Logic                         | 02            | Practical                     |
|                                  | GE/OE                  | OE-201-LOG         | Logic and<br>Methodology of<br>Science – I  | 02            | Theory                        |
| L-5.0<br>Year-II<br>Sem. IV      | MNT                    | LOG -251- MNT      | Predicate Logic and<br>Set Theory           | 02            | Theory                        |
|                                  | MNP                    | LOG -252- MNP      | Predicate Logic and<br>Set Theory           | 02            | Practical                     |
|                                  | GE/OE                  | OE-251-LOG         | Logic and<br>Methodology of<br>Science – II | 02            | Theory                        |

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| <b>S. Y. B. A 4.5/ 100 (III)</b>   |  |              |
| <b>Third Semester: Logic</b>   |  |              |
| <b>Minor</b>   |  |              |
| <b>Title: Propositional Logic</b><br><b>Subject Code: LOG -201-MNT</b><br><b>Credits: 2 (Theory)</b>   |  |              |
| <b>Course Outcomes</b>   |  |              |
| CO1  | To comprehend the nature and scope of symbolic logic   |              |
| CO2  | To define the concept modern understanding of propositions   |              |
| CO3  | To acquire student with concept of decision procedure  |              |
| CO4  | To differentiate between tautologous, contradictory and contingent forms.  |              |
| <b>Unit No.</b>  | <b>Title and Contents</b>  | <b>Hours</b> |
| <b>Theory</b>  |  |              |
| Unit 1.  | <b>Symbolic logic:</b><br>1. Concept of symbolic logic: nature, scope and applications<br>2. Modern understanding of propositions:<br>a) Simple and compound propositions<br>b) Truth-functionally and non-truth-functionally compound propositions.<br>3. Prepositional variables, Prepositional constants, Logical constants and basic truth functions<br>4. Symbolizing propositions using the above. | 15           |
| Unit 2.  | <b>Decision Procedure</b><br>1. Concept of decision procedure<br>2. Truth Table as Decision Procedure to identify propositional forms as<br>a) Tautologous, b) Contradictory, c) Contingent  | 15           |
| <b>Prescribed Reading</b> <ul style="list-style-type: none"> <li>Irving Copi, Karl Cohen and Kenneth M'cmohan, <i>Introduction to Logic</i>, 15th Edition, Pearson</li> <li>Kawale. S. R. and Gole Leela; <i>Sugama Akarika Tarkasastra</i> Vidya Prakashan, Griha Pune 1972.</li> <li>More, Hema; <i>Tarkasastra</i> Nimitta Prakashan Pune 1995</li> <li>Daryapurkar, <i>Paramparik Tarkshastra</i>, Bhupali Daryapurkar, Solapur, 1978</li> <li>Santosh Thakare, <i>Tarkshastra</i>, Kumbh Prakashan, Amravati, 2001</li> <li>Sunil Bhoite, <i>Tarkshastra: Paramparik ani Symbolic</i>, Success Publication, Pune, 2023.</li> <li>डॉ. डी. वाय. देशपांडे, तर्कशास्त्र प्रवेश, विद्या प्रकाशन नागपूर, 1998.</li> <li>केदारनाथ तिवारी, तर्कशास्त्र एवं वैज्ञानिक पद्धती, मोतीलाल बनारसीदास, दिल्ली, 2006.</li> <li>अशोक कुमार वर्मा, सरल निगमन तर्कशास्त्र, मोतीलाल बनारसीदास, दिल्ली, 2005.</li> <li>पं. द. वा. जोग, तर्कसंग्रह, कॉन्टीनेंटल प्रकाशन, पुणे, 1914.</li> </ul> |  |              |

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| <b>S. Y. B. A 4.5/ 100 (III)</b>  |   |              |
| <b>Third Semester: Logic</b>  |   |              |
| <b>Minor</b>  |   |              |
| <b>Title: Propositional Logic</b><br><b>Subject Code: LOG -202-MNP</b><br><b>Credits: 02 (Practical)</b>  |   |              |
| <b>Course Outcomes</b>  |   |              |
| CO1   | To comprehend the nature and scope of inference identify the types and structure of inference   |              |
| CO2   | To define the concept like conversion, obversion and opposition   |              |
| CO3   | To acquire student with nature and structure of opposition  |              |
| CO4   | To differentiate between induction and deduction  |              |
| <b>Unit No.</b>   | <b>Title and Contents</b>   | <b>Hours</b> |
| <b>Practical</b>  |   |              |
| Unit 1.   | <b>Inference:</b><br>Immediate inference and mediate inference<br>a) Conversion<br>b) Obversion<br>c) Opposition<br>(Rules and deductions based on these types)                   | 30           |
| Unit 2  | <b>Deductive Proof:</b><br>1. The relation between induction and deduction<br>2. Concept of deductive proof<br>3. Rules of Inference; The Rule of Replacement.<br>4. Direct proof | 30           |
| <b>Prescribed Reading</b> <ul style="list-style-type: none"> <li>Irving Copi, Karl Cohen and Kenneth M'cmohan, <i>Introduction to Logic</i>, 15th Edition, Pearson</li> <li>sKawale. S. R. and Gole Leela; <i>Sugama Akarika Tarkasastra</i> Vidya Prakashan, Griha Pune 1972.</li> <li>More, Hema; <i>Tarkasastra</i> Nimitta Prakashan Pune 1995</li> <li>Daryapurkar, <i>Paramparik Tarkshastra</i>, Bhupali Daryapurkar, Solapur, 1978</li> <li>Santosh Thakare, <i>Tarkshastra</i>, Kumbh Prakashan, Amravati, 2001</li> <li>Sunil Bhoite, <i>Tarkshastra: Paramparik ani Symbolic</i>, Success Publication, Pune, 2023.</li> <li>डॉ. डी. वाय. देशपांडे, तर्कशास्त्र प्रवेश, विद्या प्रकाशन नागपूर, 1998.</li> <li>केदारनाथ तिवारी, तर्कशास्त्र एवं वैज्ञानिक पद्धती, मोतीलाल बनारसीदास, दिल्ली, 2006.</li> <li>अशोक कुमार वर्मा, सरल निगमन तर्कशास्त्र, मोतीलाल बनारसीदास, दिल्ली, 2005.</li> <li>पं. द. वा. जोग, तर्कसंग्रह, कॉनटीनेटल प्रकाशन, पुणे, 1914.</li> </ul> |   |              |

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| Third Semester: <b>Logic</b>  |  |              |
| (General Elective / Open Elective)<br>(Only for the students of the faculties other than Humanities)  |  |              |
| <b>Title: Logic and Methodology of Science - I</b><br><b>Subject Code: OE-201-LOG</b><br><b>Credits: 2 (Theory)</b>   |  |              |
| <b>Course Outcomes</b>  |  |              |
| CO1   | To introduce and acquaint students with commonsense and science.   |              |
| CO2   | To acquire a basic understanding of hypothesis.  |              |
| CO3   | To enhance students' ability to confirmation of hypothesis   |              |
| <b>Unit No.</b>   | <b>Title and Contents</b>  | <b>Hours</b> |
| Unit1.  | <b>Nature of science:</b><br>1 Nature of science, pure and applied sciences. Commonsense and Science.<br>2 Theory and fact<br>3 Science and Human Values   | 15           |
| Unit2.  | <b>Hypothesis:</b><br>1 Nature of Hypothesis, Kinds of Hypothesis<br>2 Conditions of a good hypothesis<br>3 Confirmation of Hypothesis<br>4 Falsifications | 15           |
| <b>Prescribed Reading :</b> <ul style="list-style-type: none"> <li>Irving Copi, Karl Cohen and Kenneth M'cmohan, <i>Introduction to Logic</i>, 15th Edition, Pearson</li> <li>Dixit Shrinivas – Bhartiya Tattvajnyan, Phadke prakashan, Kolhapur, 2002.</li> <li>Kawale. S. R. and Gole Leela; <i>Sugama Akarika Tarkasastra</i> Vidya Prakashan, Griha Pune, 1972.</li> <li>More, Hema; <i>Tarkasastra</i> Nimitta Prakashan, Pune 1995.</li> <li>Daryapurkar, Paramparik Tarkshastra, Bhupali Daryapurkar, Solapur, 1978.</li> <li>Santosh Thakare, Tarkshastra, Kumbh Prakashan, Amravati, 2001.</li> <li>Sunil Bhoite, Tarkshastra: Paramparik ani Symbolic, Success Publication, Pune, 2023.</li> <li>Merrilee H. Salmon, <i>Introduction to Logic and Critical Thinking</i>, 6 th edition, Wadsworth Center Street, Bostan, USA.</li> </ul> |  |              |

- Matthew J. Van Cleave, Introduction to Logic and Critical Thinking,
- Sen M., An Introduction to Critical Thinking, Pearson Education India 2010.
- Hitchcock David, Critical Thinking, The Stanford Encyclopedia of Philosophy, Winter 2022 Edition.
- David Kelley, The Art of Reasoning (An Introduction to Logic and Critical Thinking), 4<sup>th</sup> edition, w. w. Norton & Company Ltd. Castle House, Wells Street, London. 2014
- डॉ. डी. वाय. देशपांडे, तर्कशास्त्र प्रवेश, विद्या प्रकाशन नागपूर, 1998.
- केदारनाथ तिवारी, तर्कशास्त्र एवं वैज्ञानिक पद्धती, मोतीलाल बनारसीदास, दिल्ली, 2006.
- अशोक कुमार वर्मा, सरल निगमन तर्कशास्त्र, मोतीलाल बनारसीदास, दिल्ली, 2005.

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| <b>S. Y. B. A 4.5/ 100 (IV)</b>  |   |              |
| <b>Forth Semester: Logic</b>   |   |              |
| <b>Minor</b>   |   |              |
| <b>Title: Predicate Logic and Set Theory</b><br><b>Subject Code: LOG -251-MNT</b><br><b>Credits: 02 (Theory)</b>   |   |              |
| <b>Course Outcomes</b>   |   |              |
| CO1  | To nature and origin of induction   |              |
| CO2  | To define the concept like inductive leap   |              |
| CO3  | To acquire student with the problem of induction and its solution   |              |
| CO4  | To use the knowledge and application of predicate logic   |              |
| <b>Unit No.</b>  | <b>Title and Contents</b>   | <b>Hours</b> |
| <b>Theory</b>  |   |              |
| Unit 1.  | <b>Induction:</b><br>1. Nature and origin of Induction<br>2. Types of Induction: A) Simple enumeration B) Analogy<br>3. Inductive leap<br>4. Problem of induction and its solution                                      | 15           |
| Unit 2.  | <b>Predicate logic:</b><br>1. Introduction to predicate logic<br>2. Difference between predicate logic and propositional logic<br>3. Basic terminology: Constants, Variables, Functions, predicates<br>4. Symbolization | 15           |
| <b>Prescribed Reading</b> <ul style="list-style-type: none"> <li>Irving Copi, Karl Cohen and Kenneth M'cmohan, <i>Introduction to Logic</i>, 15th Edition, Pearson</li> <li>Dixit Shrinivas – Bhartiya Tattvajnyan, Phadke prakashan, Kolhapur, 2002.</li> <li>Kawale. S. R. and Gole Leela; <i>Sugama Akarika Tarkasastra</i> Vidya Prakashan, Griha Pune, 1972.</li> <li>More, Hema; <i>Tarkasastra</i> Nimitta Prakashan, Pune 1995.</li> <li>Daryapurkar, Paramparik Tarkshastra, Bhupali Daryapurkar, Solapur, 1978.</li> <li>Santosh Thakare, Tarkshastra, Kumbh Prakashan, Amravati, 2001.</li> <li>Sunil Bhoite, Tarkshastra: Paramparik ani Symbolic, Success Publication, Pune, 2023.</li> <li>डॉ. डी. वाय. देशपांडे, तर्कशास्त्र प्रवेश, विद्या प्रकाशन नागपूर, 1998.</li> <li>केदारनाथ तिवारी, तर्कशास्त्र एवं वैज्ञानिक पद्धती, मोतीलाल बनारसीदास, दिल्ली, 2006.</li> <li>अशोक कुमार वर्मा, सरल निगमन तर्कशास्त्र, मोतीलाल बनारसीदास, दिल्ली, 2005.</li> <li>पं. द. वा. जोग, तर्कसंग्रह, कॉन्टीनेटल प्रकाशन, पुणे, 1914.</li> </ul> |   |              |

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|   | <b>S. Y. B. A 4.5/ 100 (II)</b>  |              |
|   | <b>Forth Semester: Logic</b>   |              |
|   | <b>Minor</b>   |              |
|   | <b>Title: Predicate Logic and Set Theory</b><br><b>Subject Code: LOG -252-MNP</b><br><b>Credits: 02 (Practical)</b>  |              |
|   | <b>Course Outcomes</b>   |              |
| CO1   | Comprehend the nature and scope of set Theory  |              |
| CO2   | Define the concept like intersection set   |              |
| CO3   | Acquire student with methods of sets   |              |
| CO4   | Using the knowledge of set theory in competitive examination   |              |
| <b>Unit No.</b>   | <b>Title and Contents</b>  | <b>Hours</b> |
| <b>Practical</b>  |  |              |
| Unit 1.   | <b>Set Theory:</b><br>1. Nature of SET<br>2. Methods of sets<br>3. Types of Set  | 30           |
| Unit 2.   | <b>Operations of Sets:</b><br>1. Intersection Set<br>2. Union Set<br>3. Universal Set<br>4. Complimentary Set<br>5. Solve examples by using set operations | 30           |
| <b>Prescribed Reading</b> <ul style="list-style-type: none"> <li>• Irving Copi, Karl Cohen and Kenneth M'cmohan, <i>Introduction to Logic</i>, 15th Edition, Pearson</li> <li>• Dixit Shrinivas – Bhartiya Tattvajnayan, Phadke prakashan, Kolhapur, 2002.</li> <li>• Kawale. S. R. and Gole Leela; <i>Sugama Akarika Tarkasastra</i> Vidya Prakashan, Griha Pune, 1972.</li> <li>• More, Hema; <i>Tarkasastra</i> Nimitta Prakashan, Pune 1995.</li> <li>• Daryapurkar, Paramparik Tarkshastra, Bhupali Daryapurkar, Solapur, 1978.</li> <li>• Santosh Thakare, Tarkshastra, Kumbh Prakshan, Amravati, 2001.</li> <li>• Sunil Bhoite, Tarkshastra: Paramparik ani Symbolic, Success Publication, Pune, 2023.</li> <li>• डॉ. डी. वाय. देशपांडे, तर्कशास्त्र प्रवेश, विद्या प्रकाशन नागपूर, 1998.</li> <li>• केदारनाथ तिवारी, तर्कशास्त्र एवं वैज्ञानिक पद्धती, मोतीलाल बनारसीदास, दिल्ली, 2006.</li> <li>• अशोक कुमार वर्मा, सरल निगमन तर्कशास्त्र, मोतीलाल बनारसीदास, दिल्ली, 2005.</li> <li>• पं. द. वा. जोग, तर्कसंग्रह, कॉनटीनेटल प्रकाशन, पुणे, 1914.</li> </ul> |  |              |



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| Forth Semester: <b>Logic</b>  |   |              |
| <b>(General Elective / Open Elective)</b><br>(Only for the students of the faculties other than Humanities)           |   |              |
| <b>Title: Logic and Methodology of Science - II</b><br><b>Subject Code: OE-251-LOG</b><br><b>Credits : 2 (Theory)</b> |   |              |
| CO1   | To comprehend the nature and scope of scientific explanation  |              |
| CO2   | To define the concept like Functional, D.N. Model   |              |
| CO3   | To acquire student with Research Method in social sciences  |              |
| CO4   | To acquire the skills by using the Survey, Case study, Field work, Questionnaire, Interview, Observation  |              |
| <b>Unit No.</b>   | <b>Title and Contents</b>   | <b>Hours</b> |
| Unit1.  | <b>Explanation:</b><br>1 Nature of scientific explanation<br>2 Distinction between scientific explanation and common-sense explanation<br>3 Types of scientific explanation: 1. D.N. Model, 2. Functional, 3. Statistical, 4. Teleological, 5. Probabilistic. | <b>15</b>    |
| Unit2.  | <b>Research Method in social sciences:</b><br>1. Types of data collection (SPSS)<br>2. Survey, Case study, Field work,<br>3. Questionnaire, Interview, Observation<br>(Merits, Demerits, Advantages, Disadvantages, significance, Limitations of all)         | <b>15</b>    |

**Prescribed Reading :**

- Irving Copi, Karl Cohen and Kenneth M'cmohan, *Introduction to Logic*, 15th Edition, Pearson
- Dixit Shrinivas – Bhartiya Tattvajnyan, Phadke prakashan, Kolhapur, 2002.
- Kawale. S. R. and Gole Leela; *Sugama Akarika Tarkasastra* Vidya Prakashan, Griha Pune, 1972.
- More, Hema; *Tarkasastra* Nimitta Prakashan, Pune 1995.
- Daryapurkar, Paramparik Tarkshastra, Bhupali Daryapurkar, Solapur, 1978.
- Santosh Thakare, Tarkshastra, Kumbh Prakashan, Amravati, 2001.
- Sunil Bhoite, Tarkshastra: Paramparik ani Symbolic, Success Publication, Pune, 2023.
- Merrilee H. Salmon, Introduction to Logic and Critical Thinking, 6 th edition, Wadsworth Center Street, Bostan, USA.
- Hitchcock David, Critical Thinking, The Stanford Encyclopedia of Philosophy, Winter 2022 Edition.
- David Kelley, The Art of Reasoning (An Introduction to Logic and Critical Thinking), 4<sup>th</sup> edition, w. w. Norton & Company Ltd. Castle House, Wells Street, London. 2014
- डॉ. डी. वाय. देशपांडे, तर्कशास्त्र प्रवेश, विद्या प्रकाशन नागपूर, 1998.
- केदारनाथ तिवारी, तर्कशास्त्र एवं वैज्ञानिक पद्धती, मोतीलाल बनारसीदास, दिल्ली, 2006.
- अशोक कुमार वर्मा, सरल निगमन तर्कशास्त्र, मोतीलाल बनारसीदास, दिल्ली, 2005.