

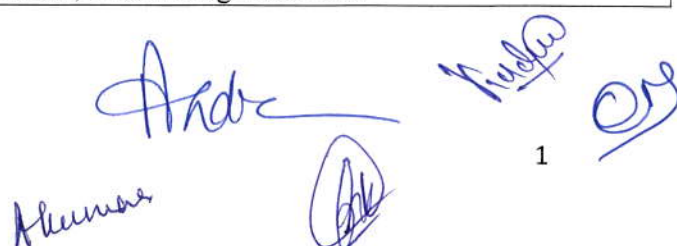
**Sri Sathya Sai College for Women, Bhopal**  
**(An Autonomous College Affiliated to Barkatullah University Bhopal)**  
**Department of Higher Education, Govt. of M.P.**  
**Under Graduate Syllabus (Annual Pattern)**

As recommended by Central Board of Studies and approved by the Governor of M. P.  
*wef 2021-2022*  
**(Session 2023-24)**  
**(NEP-2020)**

<b>Class</b>	<b>BCA</b>
<b>Year</b>	<b>I Year</b>
<b>Subject</b>	<b>Computer Applications</b>
<b>Course Title</b>	<b>Discrete Mathematics</b>
<b>Course Type</b>	<b>Elective</b>
<b>Credit Value</b>	<b>6</b>
<b>Max. Mark</b>	<b>30+70 (Minimum Marks 35)</b>
<p><b>Course Outcome:</b> This course will enable the students to:</p> <ul style="list-style-type: none"> <li>• Apply the Boolean algebra, switching circuits and their applications.</li> <li>• Minimize the Boolean Function using Karnaugh Map.</li> <li>• Understand the lattices and their types.</li> <li>• Graphs, their types and its applications in study of shortest path algorithms.</li> <li>• Test whether two given graphs are isomorphic.</li> <li>• Understand the Eulerian and Hamiltonian graphs.</li> <li>• Represent graphs using adjacency and incidence matrices.</li> <li>• Understand the discrete numeric functions, generating functions and Recurrence Relations.</li> </ul>	

**Particular**

<b>Unit I</b>	<p><b>Relations:</b> Binary, Inverse, Composite and Equivalence relation, Equivalence classes and its properties, Partition of a set, Partial order relation, Partially ordered and Totally ordered sets, Hasse diagram.</p> <p><b>Lattices:</b> Definition and examples, Dual, bounded, distributive and complemented lattices.</p>
<b>Unit II</b>	<p><b>Boolean Algebra:</b> Definition and properties, Switching circuits and its applications. Logic gates and circuits.</p> <p><b>Boolean functions:</b> Disjunctive and conjunctive normal forms, Bool's expansion theorem, Minimize the Boolean function using Karnaugh Map.</p>
<b>Unit III</b>	<p><b>Graphs:</b> Definition and types of graphs, Subgraphs, Walk, path and circuit, Connected and disconnected graphs, Euler graph, Hamiltonian path and circuit, Dijkstra's Algorithm for shortest paths in weighted graph.</p>
<b>Unit IV</b>	<p><b>Trees:</b> Definition and its properties, Rooted, Binary and Spanning tree Rank and nullity of a graph, Kruskal's and Prim's Algorithm, Cut-set and its properties, Fundamental Circuit and Cut-Set, Planar graphs.</p> <p><b>Matrix representation of graphs:</b> Incidence, Adjacency, Circuit, Cut Set, Path.</p>
<b>Unit V</b>	<p><b>Discrete numeric and generating functions:</b> Operations on numeric functions, Asymptotic behavior of numeric functions, Generating functions.</p>



	<b>Recurrence relations and recursive algorithms:</b> Recurrence relations, Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions, Solution by the method of generating functions.
<b>Keywords/Tags:</b>	Relation, Hasse diagram, Lattices, Boolean Algebra, Boolean function, Graph and Subgraph, Path and circuit, Tree, Spanning tree, Cut-set, Matrix representation of graph, Discrete numeric function, Generating function, Recurrence relation, Recursive algorithm.

### Suggestion Books:

- J. P. Tremblay and R. Manohar, Discrete Mathematical Structures With Applications To Computer Science, McGraw Hill Education, 1st edition, 2017.
- C. L. Liu: Elements of Discrete Mathematics, McGraw Hill Education, 4th edition, 2017.
- Narsingh Deo: Graph Theory with Applications to Engineering and Computer Science, Prentice Hall India Learning Private Limited, 1979.

### Reference Books:

- Seymour Lipschutz and Mark Lipson: Discrete Mathematics (Schaum Outline), McGraw Hill Education, 3rd edition, 2017.
- Edgar G. Goodaire and Michael M. Parmenter, Discrete Mathematics with Graph Theory, Pearson Education Pt. Ltd., Indian Reprint 2003.

### Suggestive digital platform web links

<https://www.highereducation.mp.gov.in/?page=xhZlQmpZwkylQo2b%2Fy5G7w%3D%3D>

### Suggested equivalent online courses

- <https://nptel.ac.in/courses/111106086/>
- [https://ugcmoocs.inflibnet.ac.in/index.php/courses/view\\_ug/311](https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/311)

### Scheme of Marks:

<b>Maximum Marks: 100</b>		
<b>Continuous Comprehensive Evaluation (CCE): 30 marks, Term End Exam Theory: 70 marks</b>		
<b>Internal Assessment:</b> Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/ Presentation	<b>30</b>
<b>External Assessment:</b> University Exam Section Time:03.00 Hours	<b>Section (A)</b> Very Short questions <b>Section (B)</b> Short questions <b>Section (C)</b> Long questions	<b>70</b>
		<b>Total 100</b>

