# ARSD College, University of Delhi

## Model Course Handout/Lesson Plan

| Course Name: | | B.Sc PROG WITH MATHS AS MAJOR | | | | |
|---|---|---|---|---|---|---|
| **Semester** | **Course Code** | **Course Title** | **Lecture (L)** | **Tutorial (T)** | **Practical (P)** | **Credit (C)** |
| I | DSC | DSC-1 ELEMENTS OF DISCRETE MATHS | 3 | 1 | 0 | 4 |
| Teacher/Instructor(s) | | ANUJ KUMAR | | | | |
| Session | | **2022-23** | | | | |

**Course Objectives:**

The primary objective of this course is to:

1) Introduce the basic tools of (Elements of Discrete Mathematics) which are helpful in understanding their applications in many real-world problems.
2) Understand/create various mathematical models in everyday life.

**Lesson Plan:**

| Unit No. | Learning Objective | Lecture No. | Topics to be Covered |
|---|---|---|---|
| 1 | Sets, Propositions and logical operations. | 1 | Sets |
| | | 2 | Propositions |
| | | 3 | logical operations. |
| | | 4 | logical operations. |
| | | 5 | logical operations. |

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|---|---|---|---|
| | Conditional statements, Mathematical induction<br><br>Relations and equivalence relation, Equivalence classes, Partial order relation, Partially ordered set. | 6 | Conditional statements. |
| | | 7 | Mathematical induction. |
| | | 8 | Mathematical induction. |
| | | 9 | Relations |
| | | 10 | equivalence relation |
| | | 11 | Equivalence classes, |
| | | 12 | Partial order relation |
| | | 13 | Partial order relation, |
| | | 14 | Partial order relation, |
| | | 15 | Partially ordered set |
| 2 | Hasse diagrams, Chain, Maximal and minimal elements, Least and greatest elements, Least upper bound, greatest lower bound in POSETS, Zorn's lemma, Functions and bijective functions | 16 | Partially ordered set |
| | | 17 | Partially ordered set |
| | | 18 | Hasse diagrams |
| | | 19 | Chain |
| | | 20 | Maximal and minimal elements |
| | | 21 | Least and greatest element |
| | | 22 | Least upper bound, |
| | | 23 | greatest lower bound in POSETS |
| | | 24 | Zorn's lemma |
| | | 25 | Functions and bijective functions |
| | | 26 | Functions and bijective functions |
| | | 27 | Functions and bijective functions |
| | | 28 | Functions and bijective functions |
| | | 29 | Functions between POSETS |
| | | 30 | Order isomorphism, |
| 3 | Functions between POSETS, Order isomorphism, Lattice as a POSET, Lattice as an algebra and their equivalence.<br>Boolean algebra, De Morgan's laws, Boolean expressions, Truth tables, Logic diagrams.<br>Quine Mc-Cluskey method, Karnaugh mapsSwitching circuits, Applications of switching circuits | 31 | Lattice as a POSET, Lattice as an algebra and their equivalence. |
| | | 32 | Bounded lattice, Sublattice, Interval in a lattice. |
| | | 33 | Products and homomorphism of lattices, |
| | | 34 | Isomorphism of lattices. |
| | | 35 | Distributive lattices, Complemented lattice |
| | | 36 | Partition and pentagonal lattice. |
| | | 37 | Boolean algebra, De Morgan's laws, |
| | | 38 | Truth tables , Logic diagrams. |
| | | 39 | Boolean functions, Disjunctive normal forms (as join of meets |
| | | 40 | Minimal forms of Boolean polynomials |
| | | 41 | Quine Mc-Cluskey method, Karnaugh maps. |
| | | 42 | Switching circuits, Applications of switching circuits. |

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**Evaluation Scheme:**

| S. No. | Component | Duration | Marks |
|---|---|---|---|
| 1 | Internal Assessment<br>• Quiz<br>• Class Test<br>• Attendance<br>• Assignment | | 25 |
| 2 | End Semester Examination | 3 hr | 75 |

**Details of the Course:**

| Unit | Content | Contact Hours |
|---|---|---|
| 1 | Sets, Propositions and logical operations. Conditional statements, Mathematical induction. Relations and equivalence relation, Equivalence classes, Partial order relation, Partially ordered set.<br>Hasse diagrams, Chain, Maximal and minimal elements, Least and greatest elements, Least upper bound, greatest lower bound in POSETS, Zorn's lemma, Functions and bijective functions | |
| 2 | Functions between POSETS, Order isomorphism, Lattice as a POSET, Lattice as an algebra and their equivalence. Bounded lattice, Sublattice, Interval in a lattice.<br>Products and homomorphism of lattices, Isomorphism of lattices. Distributive lattices, Complemented lattice, Partition and pentagonal lattic | |
| 3 | Boolean algebra, De Morgan's laws, Boolean expressions, Truth tables, Logic diagrams. Boolean functions, Disjunctive normal forms (as join of meets), Minimal forms of Boolean polynomials. Quine Mc-Cluskey method, Karnaugh maps. Switching circuits, Applications of switching circuits. | |
| | **Total** | **42** |

**Suggested Books:**

| S. No. | Name of Authors/Books/Publishers | Year of Publication/Reprint |
|---|---|---|
| 1 | Rudolf Lidl, & Gunter Pilz (2004). Applied Abstract Algebra (2nd ed.). Undergraduate text in Mathematics, Springer (SIE), Indian Reprint. | 2004 |
| 2 | Bernard Kolman, Robert C. Busby, & Sharon Cutler Ross (2009). Discrete Mathematical Structures (6th ed.). Pearson education Inc., Indian reprint | 2009 |

**Mode of Evaluation:**

Internal Assessment/End Semester Exam