**Curriculum Plan (ODD SEM 2022): B.Sc. (H) Mathematics II Year (Semester III)**

**DSC-9: Discrete Mathematics**

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| **Dr. Tajender Kumar**Assistant ProfessorDepartment of MathematicsKalindi College (University of Delhi)Delhi- 110008Mobile: +91 7417837644**E- mail**: tajenderkumar@kalindi.du.ac.in  |  | **Marks Distribution**  | **Theory** |  90 Marks |
| **Practical** |  40 Marks  |
| **Internal Assessment** | Assignment 30 Marks |
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| **Classes Assigned** | **Lectures** | 3 per week (Theory) |
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| **References** |  | 1. Davey, B. A., & Priestley, H. A. (2002). Introduction to Lattices and Order (2nd ed.). Cambridge University press, Cambridge. 2. Goodaire, Edgar G., & Parmenter, Michael M. (2006). Discrete Mathematics with Graph Theory (3rd ed.). Pearson Education Pvt. Ltd. Indian Reprint. 3. Lidl, Rudolf & Pilz, Gunter. (2004). Applied Abstract Algebra (2nd ed.), Undergraduate Texts in Mathematics. Springer (SIE). Indian Reprint.  |
|  | **Week** | **Topics** |  |
|  | **1st week (**16-19AUG) | The cardinality of a set. [2] Chapter 3 (Section 3.3). |  |
|  | **2nd week (**21-26 AUG) | Definitions, examples and basic properties of partially ordered sets, Order-isomorphisms, Covering relations, Hasse diagrams. [1]: Chapter 1 (Sections 1.1 to 1.5, Section 1.6 (up to second bullet page 4), Sections 1.14 to 1.18). [3]: Chapter 1 (Subsection 1.1). |  |
|  | **3rd week (**28 AUG-02 SEP) | Definitions, examples and basic properties of partially ordered sets, Order-isomorphisms, Covering relations, Hasse diagrams. [1]: Chapter 1 (Sections 1.1 to 1.5, Section 1.6 (up to second bullet page 4), Sections 1.14 to 1.18). [3]: Chapter 1 (Subsection 1.1). |  |
|  | **4th week (**04-09 SEP) | Dual of an ordered set, Duality principle, Bottom and top elements, Maximal and minimal elements, Zorn’s lemma, Building new ordered sets, Maps between ordered sets. [1]: Chapter 1 (Sections 1.19 to 1.24, Section 1.25 (only definition of product of partially ordered sets and diagrams to be done), Sections 1.26, 1.34, 1.35(1), and 1.36). [1]: Chapter 2 (Sections 2.1 to 2.2); [3]: Chapter 1 (Subsections 1.2 to 1.4). |  |
|  | **5th week (**11-16 SEP) | Dual of an ordered set, Duality principle, Bottom and top elements, Maximal and minimal elements, Zorn’s lemma, Building new ordered sets, Maps between ordered sets. [1]: Chapter 1 (Sections 1.19 to 1.24, Section 1.25 (only definition of product of partially ordered sets and diagrams to be done), Sections 1.26, 1.34, 1.35(1), and 1.36). [1]: Chapter 2 (Sections 2.1 to 2.2); [3]: Chapter 1 (Subsections 1.2 to 1.4). |  |
|  | **6th week (**18-23 SEP) | Lattices as ordered sets, Lattices as algebraic structures, Sublattices, Products, Lattice isomorphism. [1]: Chapter 2 (Sections 2.3 to 2.5, 2.6 (excluding portion on down-set and up-set), 2.7 (only definition of lattices Sub *G* and *N*-Sub *G* to be done), 2.8 to 2.19, 2.22 to 2.25; all results to be stated without proof). [3]: Chapter 1 (Subsections 1.5 to 1.20). |  |
|  | **7th week (**25- 30 SEP) | Lattices as ordered sets, Lattices as algebraic structures, Sublattices, Products, Lattice isomorphism. [1]: Chapter 2 (Sections 2.3 to 2.5, 2.6 (excluding portion on down-set and up-set), 2.7 (only definition of lattices Sub *G* and *N*-Sub *G* to be done), 2.8 to 2.19, 2.22 to 2.25; all results to be stated without proof). [3]: Chapter 1 (Subsections 1.5 to 1.20). |  |
|  | **8th week (**02-07 OCT) | Definitions, examples and properties of modular and distributive lattices. [1]: Chapter 4 (Sections (4.1 to 4.9); [3]: Chapter 1 (Subsections 2.1 to 2.6). |  |
|  | **9th week (**09-14 OCT) | Definitions, examples and properties of modular and distributive lattices. [1]: Chapter 4 (Sections (4.1 to 4.9); [3]: Chapter 1 (Subsections 2.1 to 2.6). |  |
|  | **10th week**. (16 OCT-21 0CT) | The M3–N5 theorem with applications, Complemented lattice, Relatively complemented lattice, Sectionally complemented lattice. [1]: Chapter 4 (Section 4.10 (result to be stated without proof), and Section 4.11). [3]: Chapter 1 (Subsections 2.7, 2.8 (except example(v)), 2.9 -2.14).(Results in 2.12, and 2.13 to be stated without proof) |  |
|  | **11th week (**23-28 0CT) | Boolean algebras, De Morgan’s laws, Boolean homomorphism, Representation theorem, Boolean polynomials, Boolean polynomial functions, Equivalence of Boolean polynomials. [3]: Chapter 1 [Subsections 3.1 to 3.8, and 3.9 (example(i); example (ii) and (iii) both without proofs); For 3.10 to 3.16 (Definitions and examples to be done. All results to be stated without proofs.)]. [3]: Chapter 1 [Subsections 4.1 to 4.10 (Definitions and examples to be done. All results to be stated without proofs)]. |  |
|  | **12th week (**30 OCT-04 NOV) | Boolean algebras, De Morgan’s laws, Boolean homomorphism, Representation theorem, Boolean polynomials, Boolean polynomial functions, Equivalence of Boolean polynomials. [3]: Chapter 1 [Subsections 3.1 to 3.8, and 3.9 (example(i); example (ii) and (iii) both without proofs); For 3.10 to 3.16 (Definitions and examples to be done. All results to be stated without proofs.)]. [3]: Chapter 1 [Subsections 4.1 to 4.10 (Definitions and examples to be done. All results to be stated without proofs)]. |  |
|  | **13th week (**06-11 NOV) | Disjunctive normal form and conjunctive normal form of Boolean polynomials; Minimal forms of Boolean polynomials, Quine-McCluskey method, Karnaugh diagrams. [3]: Chapter 1 [Subsections 4.11 to 4.14, 4.16 to 4.18 (Definitions and examples to be done. All results to be stated without proofs)]. [3]: Chapter 1 [Subsections 6.1 to 6.6 (Definitions and examples to be done. All results to be stated without proofs)]. |  |
|  | **14th week (**20-25 NOV) | Disjunctive normal form and conjunctive normal form of Boolean polynomials; Minimal forms of Boolean polynomials, Quine-McCluskey method, Karnaugh diagrams. [3]: Chapter 1 [Subsections 4.11 to 4.14, 4.16 to 4.18 (Definitions and examples to be done. All results to be stated without proofs)]. [3]: Chapter 1 [Subsections 6.1 to 6.6 (Definitions and examples to be done. All results to be stated without proofs)]. |  |
|  | **15th week** (27 NOV-02 DEC) | Switching circuits and applications, Applications of Boolean algebras to logic, set theory and probability theory. [3]: Chapter 2 [Subsections 7.1 to 7.5; 8.1, 8.3 to 8.5; 9.1 to 9.13, 9.14{(i) to (iii)}]. |  |
|  | **16th week/with 2 Days** (04-09, 11 and 12 DEC) | Revision |  |
| Dispersal of classes, preparation leave and practical examination begin- 13 December, 2023. |