

“ Certificate Course  
2021 - 2022 ”

“ A Short Course in  
Discrete Mathematics ”

22 Course Curriculum & Schedule 22



Government of West Bengal

**Government General Degree College, Muragachha**

Department of Mathematics

MURAGACHHA, NADIA, PIN- 741154

Phone No.: 03474-268008 web: [www.muragachhagovtcollege.org](http://www.muragachhagovtcollege.org) e-mail: [mgnadia2015@gmail.com](mailto:mgnadia2015@gmail.com)

Ref. No.....

Dated: 23.08.2021

# A Short Course in Discrete Mathematics

CERTIFICATE COURSE BY

DEPARTMENT OF MATHEMATICS

JOIN IN OUR PROGRAM...

STAY AHEAD OF OTHERS

**Introduction To The Course:** This course aims at introducing the concepts of lattices, Boolean algebras, switching circuits and graph theory. The course discusses some important applications of Boolean algebra and graph theory in real life situations through switching circuits and shortest path algorithms

**Outcome:** After the course the student will be able to understand the concepts of (a) lattices and their types; (b) Boolean algebra, switching circuits and their applications; (c) graphs, their types, and applications in study of shortest path algorithms.

**Course Duration:** 30 hours (Theory)

**Mode Of delivery:** Online

**Date:** 22<sup>nd</sup> Oct to 30<sup>th</sup> Oct 2021



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## Syllabus (Outline):

- Definitions, Examples, and basic properties of ordered sets, Order isomorphism, Hasse diagrams, Dual of an ordered set, Duality principle, Maximal and minimal elements
- Lattices as ordered sets, Lattices as algebraic structures, Sublattices.
- Boolean Algebras, De Morgan's laws, Boolean homomorphism, Representation theorem, Boolean polynomial functions
- Disjunctive normal form and conjunctive normal form, Minimal forms of Boolean polynomial, Karnaugh diagrams, Switching circuits and applications of switching circuits
- Introduction to graphs, Konigsberg Bridge problem, Definition, examples and basic properties of graphs, Subgraphs, Pseudographs.
- Complete graphs, Bipartite graphs, Isomorphism of graphs, Paths and circuits
- Eulerian circuits, Hamiltonian cycles, Adjacency matrix, Weighted graph.
- Travelling salesman problem, Shortest path, Dijkstra's algorithm.

Contact for information and registration:

Dr. Biswajit Saha and Mr. Prabir Chakraborty, Course Coordinators,

Department of Mathematics,

Government General Degree College, Muragachha

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## Certificate Course on "A Short Course in Discrete Mathematics" 2021

### LECTURE AND LAB SCHEDULE

TOPIC	Date	NO. OF LECTURES/ HANDSONSESSION (IN HOURS)
Definitions, Examples, and basic properties of ordered sets. Order isomorphism, Hasse diagrams, Dual of an ordered set. Duality principle. Maximal and minimal elements	22.10.2021(11.00 AM- 01.00 PM) & (02.00 PM- 04.00 PM)	04
Lattices as ordered sets, Lattices as algebraic structures, Sublattices	23.10.2021 (11.00 AM- 01.00 PM) & (02.00 PM- 04.00 PM)	04
Boolean Algebras, De Morgan's laws, Boolean homomorphism, Representation theorem, Boolean polynomial functions	25.10.2021 (11.00 AM- 01.00 PM) & (02.00 PM- 04.00 PM)	04
Disjunctive normal form and conjunctive normal form, Minimal forms of Boolean polynomial, Karnaugh diagrams, Switching circuits and applications of switching circuits	26.10.2021 (11.00 AM- 01.00 PM) & (02.00 PM- 04.00 PM)	04
Introduction to graphs, Konigsberg Bridge problem, Definition, examples and basic properties of graphs, Subgraphs, Pseudographs	27.10.2021 (11.00 AM- 01.00 PM) & (02.00 PM- 04.00 PM)	04
Complete graphs, Bipartite graphs, Isomorphism of graphs, Paths and circuits	28.10.2021 (11.00 AM- 01.00 PM) & (02.00 PM- 04.00 PM)	04
Eulerian circuits, Hamiltonian cycles, Adjacency matrix, Weighted graph.	29.10.2021 (11.00 AM- 01.00 PM) & (02.00 PM- 04.00 PM)	04
Travelling salesman problem, Shortest path, Dijkstra's algorithm	30.10.2021 (11.00 AM- 01.00 PM)	02
Certificate Distribution	30.10.2021 (01.00 PM- 02.00 PM)	

*Dr. Biswajit Saha*  
23/08/21

*Prabir Chakraborty*  
23.08.2021

Course Coordinator

(Dr. Biswajit Saha & Mr. Prabir Chakraborty)

Government General Degree College, Muragachha

*Dr. Biswajit Saha*  
23/08/2021

Officer In-Charge

Government General Degree  
College, Muragachha

Officer-In-Charge  
Govt. General Degree College Muragachha  
Muragachha, Nakashpara, Nadia



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## Study materials & 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. (2011). Discrete Mathematics with graph theory (3rd ed.). Pearson Education (Singapore ) Pvt. Ltd. Indian Reprint.
3. Lidl, Rudolf & Pilz, Gunter. (2004). Applied Abstract Algebra (2nd ed.), Undergraduate Texts in Mathematics. Springer (SIE). Indian Reprint.
4. Rosen, Kenneth H. (2012). Discrete Mathematics and its applications, with combinatorics and graph theory. (7th ed.). McGraw Hill Education. Indian Reprint.