

Curriculum Plan: B.Sc.(H)(Mathematics)(SEM-1) (ALGEBRA) (2025-26)

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Marks Distribution	Theory	90 Marks
	Internal Assessment	70 Marks
Classes Assigned	Lectures	3 per week

B.Sc. {Hons.} Mathematics {Sem I}

Teaching Plan (DSC-I: Algebra):

Weeks 1 to 4: Polynomials, The remainder and factor theorem, Synthetic division, Factored form of a polynomial, Multiple roots, Fundamental theorem of algebra, Relations between the roots and the coefficients of polynomial equations, Upper bounds for the real roots. Results on imaginary, integral and rational roots, Newton's method for integral roots, Descartes' rule of signs.

121Chapter 11, and Chapter VI (Section 67).

Weeks 5 and 6: Polar representation of complex numbers. De-Moivre's theorem for integer and rational indices and their applications, The n th roots of unity, Cardan's solution of the cubic, Descartes' solution of the quartic equation.

[1] Chapter 2 [Sections 2.1.1, 2.1.2, 2.1.3, 2.2.1, 2.2.2 (up to Figure 2.8, page 48), and 2.2.3]

121Chapter IV (Sections 4-2, 43, and 51).

Weeks 7 and 8: Statement of well ordering principle. The division algorithm in $\mathbb{Z}$. Divisibility and the Euclidean algorithm.

(4) Chapter 4 [Sections 4.1 (4.1.1 to 4.1.6), and 4.2 (4.2.1 to 4.2.11)],

Weeks 9 and 10: Fundamental theorem of arithmetic, Modular arithmetic and basic properties of congruences.

141 Chapter 4 Sections 4.3 (4.3.7 to 4.3.9), and 4.41.

Weeks 11 to 13: Groups, Basic properties, Symmetries of a square, Dihedral group. Order of a group, Order of an element. Subgroups, Center of a group, Centralizer of an element.

[3] Chapters 1, 2 and 3.

Weeks 14 and 15: Cyclic groups and properties. Generators of a cyclic group, Classification of subgroups of cyclic groups.

131 Chapter 4.

References:

1. Andreescu, Tlru & Andrica, D. (2014). *Complex numbers from A to ... Z*. (2nd ed.). Birkhauser.
2. Dickson, Leonard Eugene (2009). *First Course in the Theory of Equations*. John Wiley & Sons, Inc. The Project Gutenberg eBook: <http://www.gutenberg.org/ebooks/29785>
3. Gallian, Joseph. A. (2017). *Contemporary Abstract Algebra* (9th ed.). Cengage Learning India Private Limited, Delhi. Indian Reprint 2021.
4. Goodaire, Edgar G., & Parmenter. Michael M. (2006). *Discrete Mathematics with Crap/ 11,eory* (3rd ed.). Pearson Education Pvt. Lid. Indian Reprint 2018.