

W.e.f. 1996-97 AB

**Paper II - Linear Algebra, Differential Equations and Models** Sx 106

**UNIT 1: Second order linear equations** (scope as in Ch.3: Sections, 14, 15, 16, 17, 18, 19)

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Oscillation theory and boundary value problems (scope as in Ch.4 - Sections, 22, 23, 24 + Appendix A)

Laplace transforms (Ch.10: Sections 50, 51, 52, 53)

The existence and uniqueness of solutions (Scope as in Ch.11 Sections, 55, 56, 57).

**UNIT 2: Power series solutions and special functions** (scope as in Ch.5 sections 25, 26, 27, 28, 29, 30)

Some special functions of mathematical physics (Scope as in Ch.6 - sections, 32, 33, 34, 35).

**UNIT 3: Reduction to Jordan canonical form of  $n \times n$  matrices over  $\mathbb{R}$**  (Treatment as in any standard book on linear algebra)

Systems of first order equations (scope as in Ch.7 - section 36, 37, 38).

Nonlinear equations (scope as in Ch.8-sections, 40, 41, 42, 43, 44, 45, 46).

**UNIT 4: Models** (Scope as in Ch.1 - sections 4, 5, 6; Ch.2 - sections 12 & 13; Ch.3-sections 20, 21; Ch.7-section 39, Ch.10-section 54)

**Textbook :** Differential equations with applications and Historical Notes, by G.F. Simmons, Published by Tata McGraw Hill.

**References :** 1. S.G. Deo, V. Raghavendra: Ordinary differential equations and stability theory, 2. Martin Braun : Differential equations and their applications, Springer-verlag, Narosa, 3. Hoffman and Kunz : Linear Algebra, 4. L. Perko : Differential equations and dynamical systems, TAM7, Springer-Verlag),

It is suggested to the teacher that section 1.8 of this book contains a very good treatment of Jordan canonical forms and he may well keep this in view while teaching this topic.