MATH 2260 (Ordinary Differential Equations I) — Winter 2015 Course Outline

UNIT 1: FIRST ORDER DIFFERENTIAL EQUATIONS (approx. 4 weeks)
 1.1: Introduction, First-Order Equations, Direction Fields (§1.1–1.3)
 1.2: Integrating Factors and Variation of Parameters (§2.1, 2.2)
 1.3: Modelling with First-Order Equations (§2.3)
 1.4: Nonlinear Equations (§2.4)
 1.5: Autonomous Equations and Population Dynamics (§2.5)
 1.6: Exact Equations and Integrating Factors (§2.6)

UNIT 2: SECOND ORDER LINEAR EQUATIONS (approx. 3 weeks)
 2.1: Homogeneous Second-Order Equations (§3.1-3.3)
 2.2: Second-Order Equations with Constant Coefficiencts (§3.1, 3.4, 3.5)
 2.3: Reduction of Order (§3.5)
 2.4: Undetermined Coefficients (§3.6)
 2.5: Variation of Parameters (§3.7)
 2.6: Mechanical Vibrations (§3.8, 3.9)

UNIT 3: HIGHER-ORDER LINEAR EQUATIONS (approx. 2 weeks)
 3.1: Homogeneous nth-Order Equations (§4.1, 4.2)
 3.2: Method of Undetermined Coefficients (§4.3)
 3.3: Variation of Parameters (§4.4)

UNIT 4: THE LAPLACE TRANSFORM (approx. 2 weeks)
 4.1: Definition of the Laplace Transform (§6.1)
 4.2: Solution of Initial Value Problems (§6.2)
 4.3: Step Functions and Discontinuous Forcing (§6.3, 6.4)
 4.4: Impulse Functions (§6.5)
 4.5: The Convolution Integral (§6.6)

Section numbers (§) refer to the Seventh Edition of "Elementary Differential Equations" by Boyce and Diprima