Syllabus for Intro to Applied Mathematics/Mathematical Methods II

1. Fourier Series and Transforms
2. Ordinary Differential Equations I (Constant coefficient differential equations and the Laplace transform)
3. Variational Calculus (Euler equation, Lagrange's Equation, and some example problems)
4. Assorted Special Functions
    a. Gamma, Beta, and Error Functions
    b. Asymptotic Series and Stirling's Formula
5. Ordinary Differential Equations II
    a. Series solution of differential equations
    b. Orthogonal functions, Legendre polynomials, Bessel functions
    c. Other classes of orthogonal functions and their ODEs
6. Partial Differential Equations
    a. Basic types of PDEs
    b. model problems (heat flow, vibrating string, steady state temperature)
7. Complex Function Theory
    a. contour integrals and Cauchy's theorem
    b. Laurent series and the residue calculus
    c. conformal maps