

## Syllabus for Mathematics 9B.

Text: 11th edition of Thomas' Calculus by Finney, Weir and Giordano

### Required Lectures

#### Integration [7 lectures]

- 5.1 Estimating with Finite Sums
- 5.2 Sigma Notation and Limits of Finite Sums
- 5.3 The Definite Integral Riemann Sums and Definite Integrals
- 5.4 The Fundamental Theorem of Calculus
- 5.5 Indefinite Integrals and the Substitution Rule.
- 5.6 Substitution and Area Between Curves

#### Applications of Definite Integrals [7 lectures]

- 6.1. Volumes by Slicing and Rotation About an Axis
- 6.2 Volumes by Cylindrical Shells
- 6.3 Lengths of Plane Curves
- 6.4 Moments and Centers of Mass
- 6.5 Areas of Surfaces of Revolution and the Theorem of Pappus
- 6.6 Work
- 6.7 Fluid Pressures and Forces

#### Transcendental Functions and Differential Equations [5 lectures]

- 7.1 Inverse Functions and their Derivatives
- 7.2 Natural Logarithms
- 7.3 The Exponential Function
- 7.4  $a^x$  and  $\log_a x$
- 7.5 Exponential Growth and Decay
- 7.6 Relative Rates of Growth
- 7.7 Inverse Trigonometric functions
- 7.8 Hyperbolic Functions

#### Integration Techniques [6 lectures]

- 8.1 Basic Integration Formulas
- 8.2 Integration by Parts
- 8.3 Integration of Rational Functions by Partial Fractions
- 8.4 Trigonometric Integrals
- 8.5 Trigonometric Substitutions
- 8.6 Integral Tables, Computer Algebra Systems

### Additional Lectures