

COURSE OUTLINE FOR MATH 213: CALCULUS II

TEXT: *Calculus with Analytic Geometry*, by Larson, Hostetler and Edwards, Houghton Mifflin Company

CHAPTER

APPROXIMATE WEEKS

It is necessary to review 4.5 Integration by Substitution, and the statement of the Second Fundamental Theorem of Calculus, as discussed in 4.4 The Fundamental Theorem of Calculus.

1. Logarithmic, Exponential, and Other Transcendental Functions **3.5**
Do 5.1 The Natural Logarithmic Function: Differentiation and
5.2 The Natural Logarithmic Function: Integration.

Omit, or go light on, 5.3 Inverse Functions.

Do 5.4 Exponential Functions: Differentiation and Integration, 5.5 Bases Other Than e and Applications, 5.6 Differential Equations: Growth and Decay, 5.7 Differential Equations: Separation of Variables, 5.8 Inverse Trigonometric Functions: Differentiation, 5.9 Inverse Trigonometric Functions: Integration. In sections 5.6 and 5.7, introduce the concept of a differential equation, the technique of separation of variables, and applications. Do not get bogged down.

Omit completing the square in section 5.9.

Omit 5.10 Hyperbolic Functions.

2. Applications of Integration **2.5**

Do 6.1 Area of a Region Between Two Curves, 6.2 Volume: The Disc Method, and do arc length in 6.4 Arc Length and Surfaces of Revolution.

Do one of 6.3 Volume: The Shell Method, the area of surface of revolution in section 6.4, and 6.6 Moments, Centers of Mass, and Centroids. Do one of 6.5 Work and 6.7 Fluid Pressure and Fluid Force.

3. Integration Techniques, L'Hôpital's Rule, and Improper Integrals **3**

7.1 Basic Integration Rules in review.

Do 7.2 Integration by Parts.

Even with technology available, students should have some exposure to the techniques in sections 7.3, 7.4, and 7.5. Try to cover these sections in at most three hours.

In 7.3 Trigonometric Integrals, do integrals involving sines and cosines, but you may omit integrals involving secants and tangents.

In 7.4 Trigonometric Substitution, do at least one of the three cases.

Do 7.5 Partial Fractions. You may omit quadratic factors in the denominator. Do not get bogged down here.

Omit 7.6 Integration by Tables and Other Integration Techniques.

Do 7.7 Indeterminate Forms and L'Hôpital's Rule and 7.8 Improper Integrals.

4. Infinite Series

3

Taylor and Maclaurin Series are the most important topics in this chapter.

Go lightly on 8.1 Sequences, using examples rather than theory; give the definition of a sequence, but do limits informally with examples; do pattern recognition, making sure to include the definition of $n!$ and the meaning of $(-1)^n$. Omit the formal definition of limit, and monotonic sequences.

Do 8.2 Series and Convergence and 8.3 The Integral Test and p-Series.

Do 8.4 Comparisons of Series. The Direct Comparison Test is optional; when doing the Limit Comparison Test, concentrate on finding the correct series to compare with the given series.

Do 8.5 Alternating Series. Cover the alternating series test, and absolute and conditional convergence. If time permits, cover the alternating series remainder and rearrangement of series.

Do 8.6 The Ratio and Root Tests. Cover the Ratio Test, but not the Root Test. Note that there is a summary of tests for series on p.602.

Do 8.7 Taylor Polynomials and Approximations. Omit the subsection on the remainder of a Taylor polynomial starting on p. 611.

Do 8.8 Power Series. You may omit differentiation and integration of power series.

Omit 8.9 Representation of Functions by Power Series.

In 8.10 Taylor and Maclaurin Series, omit the convergence of Taylor series on pp. 634, 635, and you may omit binomial series on p.637.

5. Conics, Parametric Equations, and Polar Coordinates

1

Conic sections are essential for MATH 314: Calculus III. In section 9.1 Conics and Calculus, concentrate on graphing equations of second degree in x and y (without xy

terms). Do parabolas, ellipses and hyperbolas in standard form, and translations by completing the square. Emphasize recognizing the form for ellipses, parabolas and hyperbolas as this is needed in MATH 314. Do foci, directrix, eccentricity, etc. only if time permits.

Review and Testing	1
Total	14