

Calculus 222 Syllabus

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Lectures should adhere (more or less) to the order given so as to simplify the task of the tutorial program. Weeks 3 and 9 are left open. Instructors should use these to devote more time to the topics they think deserve it or to catch up. Some topics are suggested. Consult the instructor's guide for the treatment of series.

The following syllabus assumes 15 weeks of instruction.

TEXTBOOK: *Calculus and Analytic Geometry* by Thomas and Finney, 5th Ed.

Week 1

7-1,2,3 *Basics of Integration, Substitution=(Chain rule)⁻¹, Trigonometric integrand*

7-3,4 *Integration of algebraic integrands by Trigonometric Substitution*

Week 2

7-6 *Partial Fractions*

7-7 *Integration by Parts*

Week 3

OPEN (Maple, 7.8, 7.9)

Week 4

7-10 *Improper Integrals*

(16.1,2,4,5) *Algebraic and Geometric Series*

Week 5

(16.5,6,7) *Integral test, Comparison test, Ratio test, (absolute convergence and alternating series).*

16.8 *Power Series, Taylor Series*

Week 6

16-9,10,13 *Taylor's formula, e^x , $\sin x$, $\cos x$, Error, Radius of convergence*

Week 7

18-1,2,3 *Differential Equations*

18-5 *Linear 1st order*

Week 8

18-9,12 *Linear 2nd order and free vibrations*

Week 9

OPEN (diff eqs by Taylor Series, 9-3 Examples 1 and 2, $\cosh x$, $\sinh x$)

Week 10

10-1,2,3 *Polar Coordinates*

10-5 *Areas in Polar Coordinates*

Week 11

11-1,2,3,4,5 *Vectors and Parametric Equations*

Week 12

11-6,7,8,9 *Products, Lines and Planes*

Week 13

12-2 *Velocity and Acceleration*

12-3 *Tangent Vectors and Arclength* (Maple)

Week 14

12-4,5 *Normal and Curvature*

12-5 *Differentiation of dot and cross products*

12-6 *Vectors and vector functions in Polar Coordinates*

Week 15

12-6 *Planetary Motion and review*