

SYLLABUS FOR MATH 2210

Text: Edwards and Penney, *Calculus*, Early Transcendentals Version, Sixth Edition, 2003

Editorial Remarks: We are trying to include more applications and a serious introduction to first- and second-order differential equations. Numerical methods, such as trapezoidal and Simpson's rules and Euler's method in differential equations, will be treated in the lab.

I. Riemann sums and the integral

- 5.3 Elementary area computations (1 day)
Core problems: pp. 326–7, #37, 38, 49, 50.
- 5.4 Riemann sums and the integral (2 days)
Core problems: pp. 337–8, #3, 7, 10, 13, 23, 33, 45, 46.
- 5.5 Evaluation of integrals (2 days)
Core problems: pp. 347–8, #3, 8, 16, 26, 28, 43, 47, 54.
- 5.6 Fundamental Theorem of Calculus (2 days)
Core problems: pp. 356–9, #9, 17, 23, 33, 36, 43, 45, 48, 55, 56, 67.
- 5.7 Integration by substitution (2 days)
Core problems: pp. 365–8, #13, 21, 23, 27, 35, 41, 53, 55, 65, 71, 77, 78.

II. Applications of the integral

- 5.8 Areas of plane regions (2 days)
Core problems: pp. 375–8, #5, 15, 25, 45.
- 6.1 Riemann sum approximations (2 days)
(Include biological applications.)
Core problems: pp. 406–8, #25, 35, 37, 39, 42, 43, 49.
- 6.2 Volumes by cross-sections (2 days)
Core problems: pp. 416–9, #2, 3, 4, 21, 23, 27, 39, 41, 42, 46, 47.
- 6.3 Volumes by cylindrical shells (2 days)
Core problems: pp. 425–7, #5, 6, 8, 15, 17, 18, 43.
- 6.4 Arclength (optional)
- 6.5 Force and work (2 days)
(Emphasize setting up work problems from first principles. Omit discussion of pressure.)
Core problems: pp. 445–8, #7, 9, 11, 12, 13, 17, 19, 28.

III. Transcendental functions and techniques of integration

- 6.7 The natural logarithm as an integral (1 day)
(Skip a^x and $\log_a x$, other than mentioning that $a = e^{\ln a}$ and $a^x = e^{x \ln a}$.)
Core problems: p. 488, #53, 54, 56, 58, 62.
- 6.8 Inverse trigonometric functions (2 days)
(Treat only arcsin and arctan.)
Core problems: pp. 475–7, #1, 3, 5, 6, 9, 10, 19, 23, 35, 36, 41, 48, (65).

- 7.2 Integral tables and review of simple substitutions (1 day)
Core problems: pp. 495–6, #3, 9, 12, 13, 16, 17, 23, 25.
- 7.3 Integration by parts (2 days)
Core problems: pp. 501–3, #1, 5, 7, 10, 12, 13, 15, 20, 21, 41, 53.
- 7.4 Trigonometric integrals (2 days)
Core problems: pp. 509–10, #1, 5, 11, 13, 23, 24, 47, 53.
- 7.5 Rational functions and partial fractions (1 day)
(Do quadratic denominators only. Simple cases will be used in §8.5.)
Core problems: pp. 516–7, #1, 3, 4, 6, 9, 38, 41, 45.
- 7.6 Trigonometric substitutions (2 days)
Core problems: pp. 521–2, #1, 3, 5, 10, 14, 23, 50.
- 7.7 Integrals involving quadratic polynomials (1 day)
Core problems: pp. 526–8, #1, 3, 5, 11, 15, 37, 38, 39.

IV. Differential Equations

- 8.1 Simple equations and models (1 day)
Core problems: pp. 557–9, #7, 15, 20, 25, 28, 41.
- 8.3 Separable equations and applications (2 days)
Core problems: pp. 576–7, #5, 19, 27, 33, 34, 35, (41).
- 8.4 Linear equations and applications (2 days)
Core problems: pp. 587–9, #1, 3, 7, 15, 23, 27, 32, 43.
- 8.5 Population models (2 days)
Core problems: pp. 597–9, #1, 7, 13, 15, 17, 18, 23.
- 8.6, 8.7 Linear second-order equations and mechanical vibrations (3 days)
Core problems: p. 608, #1, 5, 17, pp. 618–20, #3, 11, 17, 21, (26).

This adds up to 41 days, allowing 4 days for review and exams.