(—–; 3-0-1) **Complex Analysis** MATH-228*

This course is taught to second year students in Electrical and Computer Engineering (who have taken APSC-172* but not MATH-227*) and Engineering Physics (who have taken MATH-227*). The most likely future applications for most of these students are in Fourier analysis, and in discussing the role of poles in stability analysis. Harmonic functions are discussed very briefly for the Engineering Physics section but not for Electrical and Computer Engineering. Conformal mapping is omitted.

**Textbook:** *Fundamentals of Complex Analysis for Mathematics, Science and Engineering*, 2nd Edition
by E.B. Saff and A.D. Snider (Prenctice-Hall)

**Prerequisite:** APSC-171* *and* APSC-172**and* APSC-174*.

**Instructor:** K. Sinha

**Evaluation:**

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|---|---|
| Final Examination | 50% |
| Two Quizzes (15% each) | 30% |
| Four Assignments (5% each) | 20% |

**Outline:**

1. Complex numbers, magnitude, conjugates, polar forms, the complex exponential, powers and roots, sets in the complex plane (Sections 1.1–1.6, omit 1.7).
2. Functions, limits, analyticity, Cauchy-Riemann conditions (Sections 2.1—2.4, omit 2.5, 2.6).
3. Exponential, trigonometric, hyperbolic and logarithm functions, complex powers and inverse trigonometric functions. (Sections 3.1–3.3).
4. Contour integrals, Cauchy's Theorem, Cauchy Integral Formula, Bounds on analytic functions (Sections 4.1–4.6, omit 4.7).
5. Taylor series, Laurent series, poles, singularities (Sections 5.1–5.6, omit 5.4, 5.7, 5.8).
6. Residue Theorem, residues and applications to real integrals (Section 6.1).