- **Course Number and Title:** M E 570. Engineering Analysis I
- **Catalog Description:** Introduction to engineering analysis with emphasis on engineering applications. Topics include linear algebra, linear ordinary differential equations, and linear partial differential equations with focus on analytical methods.
- **Credit Hours:** 3 Credits (3)
- **Prerequisite(s) / Corequisite(s)** Prerequisite(s): M E 328 or Consent of Instructor
  Corequisite(s): None
- **Required:** Graduate Core
- **Course Availability:** Fall Semester
- **Instructor (Usual):** Dr. Banavara Shashikanth (See https://mae.nmsu.edu/people/faculty.html)
- **Textbook:** Kreyszig, E., *Advanced Engineering Mathematics,* 10th Ed., John Wiley & Sons, Inc., 2011
- **Course Learning Objectives:**

  After completing this course, a student should have:

  1) Proficient knowledge of Laplace Transforms and application to initial value problems.
  2) Basic knowledge of phase space analysis for ODEs.
  3) Proficient knowledge of Fourier Series representations of functions, and basic knowledge of Fourier Transforms.
  4) Proficient knowledge of linear, homogeneous boundary value PDEs; basic knowledge of nonhomogeneous BVP, Poisson's equation and Green's Functions.
  5) Proficient knowledge of elementary complex functions, basic knowledge of theory of analytic functions, contour integral theorems, Laurent Series and Residue Theorem.
- **Topics Covered:**
  - Laplace Transforms—Properties and applications to Initial Value Problems
  - Phase Space Analysis for ODEs—Equilibrium Points, Linear Stability Analysis, Bifurcations and Limit Cycles
  - Fourier Analysis—Fourier Series, Fourier Integrals and Fourier Transforms
  - Linear PDEs—Homogeneous Boundary Value Problems, Separation of Variables method, Nonhomogeneous BVP, Poisson's equation and Green's functions

- Complex Variables—Analytic Functions, Cauchy-Riemann Equations, Contour Integrals, Cauchy's Theorems, Laurent Series and Residue Theorem.