- Course Number and Title:
  A E 339. Aerodynamics I

- Catalog Description:
  Fluid properties, conservation equations, incompressible 2-dimensional flow; Bernoulli's equation; similarity parameters; subsonic aerodynamics: lift and drag, analysis and design of airfoils.

- Credit Hours:
  3 Credits (3)

- Prerequisite(s) / Corequisite(s)
  Prerequisite(s): (M E 228 or MATH 392) and ENGR 234
  Corequisite(s): None

- Required:
  Required for BSAE Degree

- Course Availability:
  Fall and Spring Semesters (+Summer)

- Instructor (Usual):
  Dr. Yanxing Wang (See https://mae.nmsu.edu/people/faculty.html)

- Textbook:
  Gerhar, A.L., Hochstein, J.I., and Gerhar, P.M., *Munson, Young, Okiishi's Fundamentals of Fluid Mechanics*, 9th Ed., John Wiley, 2020 (ISBN-10: 1119597307 or ISBE-13: 978-1119597308)

- Course Learning Objectives:
  After completing this course, a student should be able to:
  1) Understand fundamental concepts of incompressible flows.
  2) Use Bernoulli equation to solve flow problems under specific conditions.
  3) Understand and use potential flow theory for canonical flows.
  4) Derive and use similarity parameters to design experiments and simulations.
  5) Gain fundamental concepts of lift and drag forces and their coefficients.

- Topics Covered:
  - Fluid statics: Pressure, hydrodynamic force, buoyancy
  - Bernoulli equation: derivation, applications, and limitations
  - Control volume analysis: Reynolds transport theory, conservation of mass, momentum and energy, and their applications
  - Differential analysis: inviscid flow, irrotational flow, potential flow, continuity and momentum equations, Navier-Stocks equations, and their applications
  - Brief introduction to external flow.