- **Course Number and Title:** A E 439. Aerodynamics II
- **Catalog Description:** Principles of compressible flow, momentum and energy conservation; thermal properties of fluids; supersonic flow and shock waves; basics of supersonic aerodynamics.
- **Credit Hours:** 3 Credits (3)
- **Prerequisite(s) / Corequisite(s)** Prerequisite(s): (A E 339 or M E 338), M E 240, and M E 328
  Corequisite(s): None
- **Required:** Required for BSAE Degree
- **Course Availability:** Fall and Spring Semesters
- **Instructor (Usual):** Dr. Fangjun Shu (See https://mae.nmsu.edu/people/faculty.html)
- **Textbook:** Anderson, Jr., J.D., *Fundamentals of Aerodynamics*, 6th Ed., McGraw-Hill, 2017 (ISBN-10: 1259129918 or ISBN-13: 978-1259129919)
- **Course Learning Objectives:**

  After completing this course, a student should be able to:

  1) Understand fundamentals of compressible flow.
  2) Solve 1D and 2D compressible flow problems including isentropic flow, shock wave and expansion wave flow problems.
  3) Understand and solve Fanno-line flow and Rayleigh-line flow problems.
  4) Calculate lift and drag coefficients of airfoils and wings under flow regimes.
- **Topics Covered:**
  - Introduction and review of thermodynamics and conservation laws
  - Fundamentals of compressible flow, shock waves and expansion waves
  - Internal flow: isentropic flow, flow in convergent-divergent nozzles, Fanno-line flow, and Rayleigh-line flow
  - External flow: airfoil theory, lift-line theory, lift coefficient, drag coefficient, low-speed, subsonic and supersonic flow, linearized theory, sound barrier and introduction to hypersonic flow.