

ENAE682 – Hypersonic Aerodynamics

- Description:** This course deals with gas-dynamical phenomena encountered as the Mach number of the flow becomes high (> 5 or so). Topics covered may include:
- General flow relations in the high Mach number limit
 - Hypersonic similitude and Mach number independence
 - Power-law similarity solutions and the blast-wave analogy
 - Newtonian flow
 - Surface inclination methods and method of characteristics
 - Shock-wave reflections and interactions
 - Hypersonic boundary layers and transition
 - Viscous interactions
 - Hypersonic facilities and experimental methods
- Instructor:** Dr. Stuart Laurence, Glenn L. Martin Hall 3184
stuartl@umd.edu, Office: 301 405 2422
- Class Schedule:** Tuesdays and Thursdays, 12:30 – 1:45, EGR 1110
- Office hours:** Wednesdays, 3pm or by appointment
- Prerequisites:** Graduate or advanced undergraduate course in compressible flow (ENAE674 or equivalent)
- Coursework:** Coursework will consist of biweekly homework assignments (~65% of grade) and one final exam/project (35%)
- Textbooks:** None required. The following may be helpful:
1. J. Anderson, Hypersonic and High-Temperature Gas Dynamics (AIAA Education) – covers most material of interest; conversational in style
 2. W.D. Hayes & R.F. Probstein, Hypersonic Inviscid Flow – advanced-level text with rigorous treatment
 3. R. N. Crabtree & L. F. Cox, Elements of Hypersonic Aerodynamics – good introductory text, but contains a lot of errors
 4. G.G. Chernyi (trans. R.F. Probstein), Introduction to Hypersonic Flow – deals with a limit range of topics, but covers them well