THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Hypersonic Flow

AEROENG 5775

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Introduction to hypersonic inviscid and viscous flows, Newtonian theory, high-temperature effects and heat transfer.

Prerequisites and Co-requisites:
Prereq: 3570, or Grad standing in AeroEng.

Course Goals / Objectives:
- Students should understand principal features of hypersonic flows and how they differ from supersonic flow, classical hypersonics theories and their strengths and limitations
- Continuum and non-continuum phenomena, High-Temperature effects, Reentry physics, Principal outstanding problems in hypersonics

Course Topics:
- Unique features of hypersonic flows
- Classical theories
- Viscous-inviscid interactions in hypersonic flows
- Hypersonic transition and turbulence
- Statistical thermodynamics and concept of non-equilibrium
- High-Temperature effects: thermo-chemical nonequilibrium
- Reentry physics, including radiation, ablation, ionization
- Modern topics a. Electromagnetic flow control b. Scramjet propulsion c. Gas surface interactions

Designation:
Elective