Santa Clara University  
Department of Mechanical Engineering  

**MECH 266 - Fundamentals of Fluid Mechanics**

**Catalog Description:** Mathematical formulation of the conservation laws and theorems applied to flow fields. Analytical flow solutions including the viscous boundary layer. Physical phenomena.

**Learning Outcomes:**
- Understand derivation and physical meaning of the terms in the Navier-Stokes and continuity equations.
- Ability to non-dimensionalize and scale experimental data.
- Use stream function and velocity potential to generate flow fields.
- Understand asymptotic behavior and solutions to flow fields including boundary layer behavior.

**Topics Covered:**
- Introduction  
  Different flow phenomena and the Reynolds number
- Equations of Motion  
  Navier-Stokes equations, assumptions
- Mathematical Development  
  Stream function, streamlines, vorticity
- Inviscid Flow  
  Bernoulli's equation, “potential flow,” Kelvin circulation theorem
- Similarity (Ch. 5)  
  Non dimensional parameters, experiments
- Low and High Reynolds Number Flow/Stability
- Viscous Flow  classical solutions
- Boundary Layers
- Assumptions, equations, solutions
- Separation: evolution of boundary layers


**Suggested References:**

**Grading:** The course grade will be based on homework and final.

**Course Type:** Required, graduate level Mechanical Engineers

**Prerequisites:** None

**Co-requisite:** None

**Engineering Honor Code:** All students taking courses in the School of Engineering agree, individually and collectively, that they will not give or receive unpermitted aid in examinations or other course work that is to be used by the instructor as the basis of grading.

**Disability Accommodation Procedure:** To request academic accommodations for a disability, students must contact Disabilities Resources located on the second floor of Benson. Phone numbers are (408) 554-4111; TTY (408) 554-5445. Students must register and provide documentation of a disability to Disabilities Resources prior to receiving academic accommodations.

**Prepared By:** Drazen Fabris               **Date:** 01/05/2011