

AA 402 COURSE DETAILS

TITLE:	Viscous Fluid Mechanics
CREDITS:	3
FORMAT & SCHEDULE:	Lecture, 3 hours / week
FACULTY CONTACT:	Antonino Ferrante

COURSE DESCRIPTION (Catalog Short Form, 50 words Max):

Introduction to fluid mechanics, dimensional analysis, effects of gravity on pressure, kinematics, conservation of mass and momentum, control-volume method, conservation of energy, vorticity and viscosity, viscous effects, Navier-Stokes solutions, and boundary layers.

COURSE OVERVIEW & LEARNING OBJECTIVES:

Students completing this course in good standing will be able to:

1. Apply dimensional analysis.
2. Explain and calculate the effects of gravity on pressure.
3. Calculate vorticity, circulation, streamlines, streaklines and pathlines.
4. Apply conservation of mass, momentum and energy.
5. Derive and apply Navier-Stokes solutions.
6. Derive and apply boundary layer equations.

COURSE REQUIREMENTS

PREREQUISITES: 1) MATH 324
2) A A 301

REQUIRED TEXTBOOK: *Basic Fluid Mechanics*, 5th ed, D. C. Wilcox, DCW Industries, 2012

COURSE SCHEDULE

Topics

Introduction to fluid mechanics; Dimensional Analysis

Effects of gravity on pressure

Kinematics

Conservation of mass & momentum

Control-volume method

Conservation of energy

Vorticity and viscosity

Viscous effects

Navier-Stokes solutions

Boundary layers