ME 58:143:001 COMPUTATIONAL FLUID AND THERMAL ENGINEERING
Fall 2003

INSTRUCTOR: Associate Professor Ching-Long Lin
Department of Mechanical and Industrial Engineering, 2406 SC
Phone: 319-335-5673, Email: ching-long-lin@uiowa.edu
Research website: http://css.engineering.uiowa.edu/~ching
Class website: http://css.engineering.uiowa.edu/~me_143

OFFICE HOURS: 9:30a.m.-10:30a.m. MW or by appointment, 2406SC

DESCRIPTION: Governing equation and models of fluid flow and heat transfer; basic
numerical techniques for solution; estimation of accuracy and stability of
the numerical approximations; boundary conditions; grid generation;
structure and performance of commercial software for applications in
analysis and design of thermo-fluid systems

PREREQUISITES: 057:012 Linear Systems Analysis, 058:045 Heat Transfer

SCHEDULE:
LEcTure   TIME & LOCATION: 8:30AM - 9:20AM MWF 3026SC
LAB       TIME & LOCATION: 8:30AM - 9:20AM W 1245 SC

TEXT: Computational Fluid Dynamics, John D. Anderson, JR.

LEARNING OBJECTIVES:
1. The student will have an understanding of fundamental governing equations of
   computational fluid flow and heat transfer.
2. The student will learn about basic computational techniques for the solution of fluid
   flow and heat transfer.
3. The student will become familiar with commonly used commercial software packages
   for computational fluid dynamics and heat transfer.
4. The student will utilize a computer software tool to learn about design aspects of fluid
   and thermal engineering.

COURSE OUTLINES:
1. Governing Equations
2. Mathematical Behavior of Partial Differential Equations and Its Impact on
   Computational Fluid Dynamics and Heat Transfer
3. Basic Aspects of Discretization, Numerical Errors and Stability
4. Grid Generation
5. Some Simple Techniques for Computational Fluid Dynamics and Heat Transfer and
   Turbulence Modeling
6. Commercial Codes: Gambit (grid generation) and Fluent (solvers) learning modules
7. Final Project
**REFERENCE BOOKS** (PUT ON RESERVE AT THE ENGINEERING LIBRARY)

3. Computational Fluid Dynamics (an Introduction), John F. Wendt

**EVALUATION:**

- Homework: 40%
- 2 Midterm Exams, counted as 10% each: 20%
- Oral Presentation: 9%
- Final Project: 31%
- Total: 100%