Instructor: Dr. Kathleen Feigl
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Web: http://www.math.mtu.edu/~feigl
Lectures: MWF 12:05–12:55, 126 Fisher Hall
Office Hours: MWF 13:00–14:00, or by appointment

Prerequisites: Differential Equations and Multivariable Calculus, or consent of instructor; Programming language (Fortran, C++, etc.)


Contents: The course discusses principles and applications of numerical methods to solve problems in fluid dynamics. Topics include:

- Conservation equations from fluid mechanics and the Navier-Stokes equations
- Finite element methods for laminar, incompressible flow problems (mixed and penalty methods)
- Finite difference methods for transient flow problems
- Non-Newtonian flow problems and rheological models
- Non-isothermal flow problems
- Free surface problems
- Linear and nonlinear solvers
- Stability and error analysis
- Postprocessing
- Time permitting: Intro to finite volume methods, boundary integral methods

Homework: Written homework assignments and computer projects will be assigned and graded (70% of grade).

Final Exam: There will be a final exam (30% of grade).

Class Policies:

- Attendance in class is expected. If you are unable to attend a class due to illness or personal loss, contact the instructor as soon as possible.
- Students are expected to hand in homework assignments and computer projects on time.

Affirmative Action Notice: “MTU complies with all federal and state laws and regulations regarding discrimination, including the ADA Act of 1990. If you have a disability and a need, a reasonable accommodation for equal access to education or services can be made through the Dean of Students Office (Gloria Melton 487-2212). For concerns regarding discrimination of any kind, please contact your advisor, department head, or affirmative action office.”