Instructor:  Prof. Arindam Banerjee (Email: banerjea@mst.edu)  
184Toomey Hall, Missouri S&T  
Rolla, MO 65409. Phone: 573-341-4494

Class schedule:  
Tuesday-Thursday: 8.00-9.15 am  
Class Location:  
Toomey Hall 260
Office hours:  
Monday/Wednesday: 4.00 – 5.00 pm

Grading Outline:  
Homework – 20%, 2 mid-term exams: 25% each  
Final Exam (Comprehensive): 30%.

Grading Policy:  
FINAL GRADES will be curved. Tentative breakdown:  
B-C: Cutoff at class mean score,  
A: Above 1 standard deviation from mean,  
D: Below 1 standard deviation from mean,  
F: Below 2 standard deviations from mean

Prerequisites:  
ME/AE 231 or 1 undergraduate fluid mechanics class.

Course objectives:  
This course is designed to follow ME/AE 231 and give the students an overview of various aspects of incompressible fluid flow. In particular, derivation and solutions to the conservation equations, laminar boundary layers and viscous flows will be discussed. In addition, the course will introduce advanced topics of incompressible flows: (a) numerical methods for solving fluid flows (FDM); (b) turbomachinery, and (c) turbulent flows. The topics are meant to equip the undergraduate students with all aspects of fluid dynamics and also provide graduate students a sound theoretical foundation for more advanced thermo-fluid courses or their research.

Textbook:  

Software:  
We will use Fluent CFD software and the software that comes with the text book for our programming needs. Occasional assignments will use MATLAB.

Blackboard:  
All course related materials (including class notes) will be on Blackboard

Topics to be covered:

1. Integral Relations for a Control Volume – solution of mass, linear momentum and angular momentum relations, laminar/turbulent boundary layers and other test cases.
2. Turbo-machinery: Pump Performance & Selection, Wind-turbine design and analysis, Hydraulic Turbine design and analysis
4. Preliminary CFD – usage of Fluent to solve basic fluid flow problems. Student will have a working knowledge of CFD after this class.
5. Fundamentals of Turbulent Flows – examples & turbulent boundary layers

Policies

➢ Home-works are due at the start of class – no late home-works will be accepted. For distance students, home-works must be submitted by using Digital Drop-box in Blackboard before 8am on the due-date.

➢ The final exam is comprehensive (i.e. it will contain all topics covered in class)

➢ If final exam score exceeds overall average, grade will be based entirely on the final. However, the student must score at least 50% on the rest of the class work (home-work included). No exception to this rule will be made.

➢ On campus students must come to class – watching lectures online in lieu of coming to class is not an excuse for absence.

➢ Mid-term exams will be in class for Campus Students. Distance Students will need to pick a time (within 48 hrs of the scheduled exam) and let me know when they want to take the test. I will email them the test and will expect to have the test back (using Digital Drop-box in Blackboard) in 2 hrs. The extra time is to accommodate scanning and emailing the test.