C-21-2 Models in Applied Mathematics

Winter 1996

Prof. Hermann Riecke

Outline

Section	Topic
4.	Continuum Mechanics: Fluid Mechanics
	Kinematics of Continua
	Conservation of Mass
	Conservation of Momentum
	Conservation of Energy
	Potential Flow, Complex Variables
	Sound Waves
	Viscous Flows
	Parallel Flows, Orr-Sommerfeld Equation
	Turbulent Flows
	Toy Model for Complex Dynamics
5.	Electromagnetism
	Electrostatics, Coulomb Force, Poisson Equation
	Boundary Value Problems: Images
	Magnetostatics: Lorentz Force, Biot-Savart Law
	Electrodynamics: Maxwell's Equations
	Electromagnetic Waves, Lorentz Transformations
6.	Elasticity
	Deformation and Strain
	Generalized Hooke's Law
	Navier's and Beltrami-Michel Equations
	Elastic Waves

Again, there will be no designated text book. But various books will be on reserve. Highly recommended (good to own and not expensive) are:
1) *Mathematics applied to determnistic problems in the natural sciences*,
by C.C. Lin and L.A. Segel. SIAM classics in applied mathematics,
2) *Mathematics applied to continuum mechanics*,
by L.A. Segel, Dover, 1987.

There will be regular homework assignments which I will grade. There won't be a a midterm or final.

I will give an extra discussion section: time and place to be arranged

Office Hour: Mo 5.15-6.15 # 3814 and by appointment