

Course Syllabus-Fall 2006
ChE 5984
Dynamic Theory of Complex Fluids

Topic #	# Lectures	Description	Reference
1	2	Course Introduction; Static Properties of Polymers	Chp. 2, TPD
2	3	Review of vector and tensor calculus	App. A, DPL, Vol. 1
3	3	Review of continuum mechanics and constitutive relations: linear viscoelasticity; differential models; finite strain tensors; integral constitutive equations	Notes (various chapters DPL, vol 1)
4	4	Elastic dumbbell models for flexible polymers	Chp. 10, DPL, vol. 2
5	3	Chain-like models for flexible polymers: Rouse Model	Chp 12, DPL, vol. 2
6	6	Entangled linear polymers: network theories; tube theories; branched polymers	Handouts; TPD, chp 7; literature
7	3	Rigid rod models	Chp. 11, DPL, vol. 2
8	2	Bead rod models	Chp 13, DPL, vol. 2
9	3	Entangled rods; liquid crystalline order	Chp 9, TPD
10	10	Miscellaneous topics	
11	2	Exams: Mid-semester; final	

Instructor: Donald G. Baird, 128 Randolph Hall, Office hours: 9-10AM MWF and by appointment

Grading: Homework 60%, Hourly Exam 20%, Final Exam 20%

References: 1. *The Theory of Polymer Dynamics*, M. Doi and S. F. Edwards; 2. *Dynamics of Polymer Liquids: Fluid Mechanics: Volume I*, by Bird, Armstrong, and Hassager; 3. *Dynamics of Polymer Liquids: Fluid Mechanics: Volume II*, by Bird,

Armstrong, and Hassager; *Constitutive Equations for Polymer Melts and Solutions*, R. G. Larson; Various papers. I will try to give you copies of the key chapters and papers.

The Honor code will be strictly enforced in this course. All assignments submitted shall be considered graded work, unless otherwise noted. All aspects of your coursework are covered by the honor system. Any suspected violations of the honor code will be reported to the honor system. Honesty in your academic work will develop into professional integrity. The faculty and students of Virginia Tech will not tolerate any form of academic dishonesty.