Bioengineering 4001. Biotransport
Spring 2014

Tentative Lecture Outline (Version 1/7/2014)

Introduction
Jan 7  Introduction

Module 1: Compartmental Modeling of Transport in Organs and Organisms
Jan 7  Irreversible Flow Mass Balance
Jan 9  Concentration Driven Mass Transport
Jan 14 Pharmacokinetic Modeling
Jan 16 Reaction Kinetics
Jan 21,23 Multicompartment Reaction Kinetics
Jan 28  Review HW 1
Jan 30  Exam 1

Module 2: Electrochemical Diffusion
Feb 4  Diffusion Across Membranes
Feb 6  1D Diffusion
Feb 11 2D and 3D Diffusion
Feb 13 Passive Chemical Diffusion
Feb 18,20 Electrochemical Diffusion and Transport
Feb 25  Review HW 2
Feb 27  Exam 2

Module 3: Biofluid Mechanics
March 4  Fluid Constitutive Properties and Statics
March 6  3D Conservation Laws. Lab 1 Due.
March 11,13 Spring Break
March 18  Low Reynolds Number Stokes Flow
March 20, 25 Cardiovascular Fluid Dynamics
March 27  Ultrasound and Bioacoustics
April 1  Review HW 3
April 3  Exam 3

Module 4: Biomedical Devices
April 8  Kidney Dialysis
April 10 Osmotic Transport and Pumps. Lab 2 Due.
April 15 Cell and Molecular Fractionation. Chromatography.
April 17 Biosensors.
April 22  Review HW 4
April 24  Exam 4, 10:30 AM