

Abstract for an Invited Paper  
for the DFD07 Meeting of  
The American Physical Society

### **Biofluid Mechanics Education at U Michigan**

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At the University of Michigan, biofluid mechanics is taught in the Department of Biomedical Engineering with cross-listing in Mechanical Engineering. The course has evolved over 25 years and serves advanced undergraduates and graduate students. The course description is as follows: BiomedE/MechE 476 Biofluid Mechanics. CATALOG DESCRIPTION: This is an intermediate level fluid mechanics course which uses examples from biotechnology processes and physiologic applications including cellular, cardiovascular, respiratory, ocular, renal, orthopedic, and gastrointestinal systems. COURSE TOPICS: 1. Dimensional analysis (gastrointestinal, renal) 2. Approximation methods, numerical methods (biotechnology, respiratory) 3. Particle kinematics in Eulerian and Lagrangian reference frames (biotechnology, respiratory) 4. Conservation of mass and momentum 5. Constitutive equations (blood, mucus) 6. Kinematic and stress boundary conditions: rigid, flexible, porous (cardio-pulmonary, cellular) 7. Surface tension phenomena (pulmonary, ocular) 8. Flow and wave propagation in flexible tubes (cardio-pulmonary) 9. Oscillatory and pulsatile flows (cardio-pulmonary, orthopedic) 10. High Reynolds number flows (cardio-pulmonary) 11. Low Reynolds number flows (biotechnology, cellular, vascular) 12. Lubrication theory (vascular, orthopedic) 13. Flow in poroelastic media (orthopedic, pulmonary, ocular) 14. Video presentations of laboratory experiments.