

## **BME 351 - Introduction to Biofluid Mechanics**

3 Credits, 3 Contact hours

Instructor: Max Roman, Ph.D.

### **Textbook(s)/Materials Required:**

Applied Biofluid Mechanics, Lee Waite and Jerry Fine. ISBN -10: 0-07-147217-7

A Brief Introduction to Fluid Mechanics, Young, Munson, and Okiishi; Fifth Edition. (NOTE: You may also use an older edition)

### **Co-Pre-requisites:**

BME 302: Mechanical Fundamentals of Biomedical Engineering

Mech 236: Dynamics. (Recommended Co-requisite)

**TEXT BOOK DESCRIPTION:** A Brief Introduction to Fluid Mechanics, 5th Edition is designed to cover the standard topics in a basic fluid mechanics course in a streamlined manner that meets the learning needs of today's student better than the dense, encyclopedic manner of traditional texts. This approach helps students connect the math and theory to the physical world and practical applications and apply these connections to solving problems. The text lucidly presents basic analysis techniques and addresses practical concerns and applications, such as pipe flow, open-channel flow, flow measurement, and drag and lift. It offers a strong visual approach with photos, illustrations, and videos included in the text, examples and homework problems to emphasize the practical application of fluid mechanics principles.

### **Course objectives**

This is an introductory course in the study of fluid mechanics and biofluids. The student will gain the understanding of the underlying assumptions and models that are applied when solving fluid mechanics problems. Based on the assumptions made, the student will learn to differentiate between the various approaches and solutions applied to a wide variety of fluid mechanics problems related to physiological processes, medical devices, and laboratory setups as used for testing and measuring. A significant objective is to reinforce the student's prior knowledge in calculus, differential equations, and engineering as it applies to fluid mechanics. Computational Fluid Dynamics (CFD) and MATLAB will be introduced to emphasize Computer Aided Engineering (CAE). The student will gain the necessary foundation for BME 451 Biomechanics I and for more advanced graduate level fluids courses.