BME 427 – Biotransport

3 Credits, 3 Contact hours
Instructor: Treena Livingston Arinzeh, Ph.D.

Textbook(s)/Materials Required:
"Transport Phenomena in Biological Systems", 2nd Edition, Truskey, Yuan, Katz, 2009.
Supplemental handouts will be provided as needed.

Description:
Prerequisites: MATH 222
This course is an introduction to transport phemonena in biological systems. The objective of this course is to gain knowledge of the basic principles of transport phenomena. The course will cover conservation relations in fluid transport with an emphasis on conservation of mass at the tissue and cellular levels. Topics will include fundamentals of mass transport and applications such as transport in porous media, transvascular transport and drug delivery.

Prerequisite:
MATH 222

This is a required course for the Biomaterials and Tissue Engineering Track.

Course Learning Outcomes (CLOs):
By the end of the course you should be able to do the following:

1. **Solve Problems at the Interface of Biology and Engineering:** Understand the fundamental principles of cell biology, molecular biology, and engineering towards understanding transport processes in the body and design of medical devices. Apply knowledge of math, engineering and science to identify, formulate, and solve problems in this area.

2. **Transport Modeling:** Apply knowledge of math, engineering and science to understand the principles of mass transport.

Student Outcomes:

Student outcome A – ability to apply foundations of mathematics, science, and engineering
Related CLO – 1

Student outcome M-1 – ability to model bio- & physiological systems
   Related CLO - 2

Course Topics: Mass Transport, Diffusion with Convection, Transport in Porous Media, Transvascular Transport, Mass Transport with Biochemical Interactions, Cell Surface Ligand-Receptor Kinetics, Cell Adhesion, Transport of Gases between Blood and Tissues, Drug Transport