BME 479: Biotransport

Class Location & Time
1014 DOW; Monday & Wednesday 9:30 am - 11:30 am

Instructor
Prof. Cheri X. Deng (cxdeng@umich.edu); Office Hours (2111 Gerstacker): F 11:00 – noon.

Course Summary
This course covers the fundamentals of mass transport related to biomedical or living systems. After establishing the basic principles of transport, a variety of biological transport phenomena, with length scale ranging from intracellular to organ level, will be examined. Specifically, topics include mass transport by diffusion, along with effects of convection, chemical reactions, and other mechanisms will be covered. Emphases are given with regard to fundamental principles, quantitative approaches, as well as applications of these principles and techniques.

Pre-requisites
Calculus, ordinary and partial differential equations, and fluid mechanics.

Course Objectives
Understanding biotransport principles and mastering of the basic quantitative approaches in analyzing biotransport problems. Three critical goals of this course are:

1) To be able to mathematically define and describe general biotransport problems including derivation of the governing equation and defining the appropriate boundary/initial conditions;
2) To be able to solve a variety of basic biotransport problems;
3) To be able to apply mass transport models and approaches to biomedical problems and to interpret the solutions/results

Required Textbook, Course Materials, and Course/Instruction Format

Selected research manuscripts (journal articles) will be used in the course.

Assessment/Grading
- Regular homework assignments (total worth of 10%). No late homework will be accepted.
- Pop quizzes, total worth 10%.
- Four sectional exams, with first three exam each accounting for 20%, and the 4th exam accounting for 10%.
- One special project, accounting for 10%. The special project will focus on a set of research articles, including a group classroom presentation (5%) and a term paper (5%). Note that Exam 4 (10%) will be based on these research articles and some basic principles of biotransport.

Exam Schedule:
Exam 1: January 30 (20%)
Exam 2: February 22 (20%)
Exam 3: March 27 (20%)
Exam 4: April 17 (10%)
## Tentative class/lecture schedule (may change slightly depending on progress)

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