Math 463:
Introduction to Mathematical Biology

MWF 1:00-2:00, 3088 East Hall

Computer Lab Location: B745 East Hall

http://www.math.lsa.umich.edu/∼tjacks/Math463_05.html

Instructor: Dr. Trachette Jackson

Course Synopsis:

A variety of topics in population biology, physiology and in the biomedical sciences will be considered including single and competing species ecological models, enzyme reaction kinetics, molecular motors, epidemiology, and infectious diseases. There will time set aside for group discussions and modeling projects related to the more interesting and advanced issues concerning the topics mentioned above. Approximately one class period each week will be held in the mathematics computer laboratory where numerical techniques for finding and visualizing solutions of differential and discrete systems will be discussed.

Text:

This course will follow closely the first several chapters of: *Mathematical Models in Biology*, Leah Edelstein-Keshet, 1988 supplemented by material from the current literature and lecture notes from the instructor.

Prerequisites:

A major focus of this course will be the derivation and analysis of discrete and differential equations which model specific biological and medical problems. In order to be successful in this course, it will be necessary to have completed the following mathematics courses or their equivalent: Math 217, 417, or 419 and Math 216, 286 or 316 or to have permission of the instructor.

Grading:

Grades will be based on the completion of a final project which will require an in class presentation as well as a substantial research paper (25%), two examinations (50%), and weekly (or biweekly) homework assignments and in class presentation of problems (25%). Note: There will also be numerical component to some of the homework assignments which will require the use of MATLAB or MAPLE.

- Homework policy
  NO LATE homework will be accepted. All homework will be due at the BEGINNING of class.

Office Hours and Location:

I will be available outside of class time to assist with homework and project preparation during the following times or by appointment:

Tuesdays 1:00pm - 2:00pm and Thursdays 11:00am - 12:00pm

My office is located in East Hall #3854. To schedule an appointment please call 764-8537 or send an email to tjacks@umich.edu.

Schedule

(**DISCLAIMER:** This is a *ROUGH* schedule. I reserve the right to modify this as needed.)

WEEK	MON.	TOPIC	WED.	TOPIC	FRI.	TOPIC
1			**Sept. 9**	Intro/Bacteria Growth	**Sept. 11**	Lab 1
2	**Sept. 14**	Breathing Model	**Sept. 16**	Linear Systems	**Sept. 18**	Lab 2
3	**Sept. 21**	Apoptosis & Cancer	**Sept. 23**	Nonlinear Models	**Sept. 25**	Lab 3
4	**Sept. 28**	Nonlinear Systems	**Sept. 30**	Nonlinear Systems	**Oct. 2**	Lab 4
5	**Oct. 5**	Single Species	**Oct. 7**	Spruce Budworm	**Oct. 9**	Lab 5
6	**Oct. 12**	The Chemostat	**Oct. 14**	Stability/Phase Plane	**Oct. 16**	Lab 6
7	**Oct. 19**	No School	**Oct. 21**	Molecular Motors	**Oct. 23**	Molecular Motors Lab
8	**Oct. 26**	Review/Projects	**Oct. 28**	Exam I - In class	**Oct. 30**	EXAM I - In lab
9	**Nov. 2**	Cancer	**Nov. 4**	Cancer Lab	**Nov. 6**	Epimeiology
10	**Nov. 9**	SIR Models	**Nov. 11**	In Class Project	**Nov. 13**	Lab
11	**Nov. 16**	Enzyme Kinetics	**Nov. 18**	Enzyme Kinetics	**Nov. 20**	Enzyme Kinetics
12	**Nov. 23**	Intro PDEs	**Nov. 25**	Intro PDEs	**Nov. 27**	No School
13	**Nov. 30**	Guest Speakers	**Dec. 2**	Review	**Dec. 4**	Presentations
14	**Dec. 7**	Presentations	**Dec. 9**	Presentations	**Dec. 11**	Presentations
15	**Dec. 14**	Presentations				

FINAL EXAM : Due Thrusday, December 17 by 3:00pm.