Oregon Health & Science University  
Department of Medical Informatics and Clinical Epidemiology  

BMI 558/658  
Biological Modeling and Simulation  
Spring Term, 2016  

Monday/Wednesday 12:00-1:30pm., CHH 3172 Room 3  

Instructor: Arie Baratt, Ph.D.  
Office hours: Tuesday 10 am – 12 pm, or by appointment  
Phone: (503) 418-3626  
Electronic mail: baratt@ohsu.edu  

Suggested Textbook: “MATLAB: An Introduction with Applications” by A. Gilat (any edition). Free online interactive tutorials and a user’s guide can be found at the official MATLAB website http://www.mathworks.com  

Course Description:  
Overall focus is on developing and interpreting computational models of biological systems. An overview of sound model design, implementation, testing and prediction will be presented applying to various scales of biological detail (ecological, extra-cellular, intra-cellular). Topics include ordinary and partial differential equations, numerical instability, biological feedback, parameter estimation, model validation, uncertainty/sensitivity analysis, stochastic models. Hands-on applications of theoretical methodology are emphasized and include weekly assignments.  
Course assignments and simulations will use MATLAB, but previous MATLAB programming experience is not required. Student version of MATLAB can be purchased for $99 at https://www.mathworks.com/store/link/products/student.  

Prereqs:  
Programming experience and calculus are required. Basic knowledge of ordinary differential and partial differential equations is a plus. Signature required.  

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<tr>
<th>Week</th>
<th>Topic</th>
<th>chapter</th>
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<tbody>
<tr>
<td>1</td>
<td>Review Syllabus, Course Expectations, Why model/simulate?</td>
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<td>1</td>
<td>Modeling Objectives, Types of Models and Modeling Process</td>
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<td>2</td>
<td>Introduction to Matlab</td>
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<td>2</td>
<td>Qualitative Model Formulation: Forrester Diagrams, FDE's,</td>
<td>2,3</td>
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<tr>
<td>3</td>
<td>Quantitative Model Formulation: ODE's, Feedback</td>
<td>4</td>
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Course Grading Policy:
Grades will be based on scores from examinations and homework assignments. The point breakdown is as follows:

<table>
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<tr>
<th>Assignments</th>
<th>40%</th>
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<tbody>
<tr>
<td>Mid-Term Exam</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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The following grades are possible in this course: A, A-, B+, B, B-, C+, C, C-, F. Since the grades will be curved, the cutoff points for each letter grade are not yet known. They will be determined at the end of the quarter and communicated to students at that time.

Graduate Studies in the OHSU School of Medicine is committed to providing grades to students in a timely manner. Course instructors will provide students with information in writing at the beginning of each course that describes the grading policies and procedures including but not limited to evaluation criteria, expected time needed to grade individual student examinations and type of feedback they will provide.

Class grades are due to the Registrar by the Friday following the week of finals. However, on those occasions when a grade has not been submitted by the deadline, the following procedure shall be followed:
1) The Department\textsuperscript{1}/Program Coordinator\textsuperscript{2} will immediately contact the Instructor requesting the missing grade, with a copy to the Program Director and Registrar.
2) If the grade is still overdue by the end of next week, the Department\textsuperscript{1} /Program Coordinator\textsuperscript{2} will email the Department Chair directly, with a copy to the Instructor and Program Director requesting resolution of the missing grade.

3) If, after an additional week the grade is still outstanding, the student or Department\textsuperscript{1} /Program Coordinator\textsuperscript{2} may petition the Office of Graduate students for final resolution.

\textsuperscript{1} For courses that are run by a specific department.

\textsuperscript{2} For the conjoined courses (course number is preceded by CON_ that are run by Graduate Studies.

**Academic Integrity:** The students must following the OHSU guidelines for academic integrity. You may discuss the general concepts and principles behind an assignment with other students. In fact, you are encouraged to do this, because it often leads to better comprehension of the material. However, in doing assignments, each student is expected to develop an individual solution. Under no circumstances should a student copy or consult the solution of another student, or copy a solution from any other source, including the Internet. See http://www.ohsu.edu/xd/education/library/research-assistance/plagiarism.cfm?WT_rank=1# and http://www.ohsu.edu/xd/education/teaching-and-learning-center/for-students/index.cfm for more information.

**Attendance policy:** No penalty will be implemented for not attending the class, however, the course covers plenty of material, and though there will be readings and handouts, some information is only presented and explained during lectures.

**Copyright Information:** Every reasonable effort has been made to protect the copyright requirements of materials used in this course. Class participants are warned not to copy, audio, or videotape in violation of copyright laws. Journal articles will be kept on reserve at the library or online for student access. Copyright law does allow for making one personal copy of each article from the original article. This limit also applies to electronic sources.

To comply with the fair use doctrine of the US copyright law, Sakai course sites close three weeks after grades are posted with the Registrar. Please be sure to download all course material you wish to keep before this time as you will have no further access to your courses.

**DMICE Communication Policy**

1. If the syllabus directs the student to contact the TA before contacting the instructor, the student should do so. Otherwise, the student should contact the instructor and allow 2 business days (not including weekends) for a response.

2. If the student does not receive a response from the instructor within 2 business days, s/he should contact the TA (if there is one). When contacting the TA s/he should cc the instructor and Diane Doctor at doctord@ohsu.edu.

3. If a student does not receive a response from the TA within 1 business day (not including weekends), s/he should contact Diane Doctor at doctord@ohsu.edu and cc the instructor and the TA.

4. If Diane does not reply within 1 business day (not including weekends), the student should contact Andrea Ilg at ilgan@ohsu.edu.
5. Students having difficulties with Sakai should contact the Sakai Help Desk at sakai@ohsu.edu or at (877) 972-5249. Sakai help is available M-F from 8am to 9pm and weekends from Noon to 5pm. Do not contact the instructor.

Syllabus Changes And Retention: This syllabus is not to be considered a contract between the student and the School of Medicine. It is recognized that changes may be made as the need arises. Students are responsible for keeping a copy of the course syllabus for their records.

Student Access: OHSU is committed to providing equal access to qualified students who experience a disability in compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Act (ADA-AA) of 2008. If you have a disability or think you may have a disability (physical, sensory, chronic health, psychological or learning) please contact the Office for Student Access at (503) 494-0082 or studentaccess@ohsu.edu to discuss eligibility for academic accommodations. Information is also available at www.ohsu.edu/student-access. Because accommodations may take time to implement and cannot be applied retroactively, it is important to have this discussion as soon as possible. All information regarding a student’s disability is kept in accordance with relevant state and federal laws.

Academic Honesty: Course participants are expected to maintain academic honesty in their course work. Participants should refrain from seeking past published solutions to any assignments. Literature and resources (including Internet resources) employed in fulfilling assignments must be cited. See http://www.ohsu.edu/xd/education/library/research-assistance/plagiarism.cfm?WT_rank=1# for information on code of conduct for OHSU and http://www.ohsu.edu/xd/education/teaching-and-learning-center/for-students/index.cfm for more information on citing sources and recognizing plagiarism.

In an effort to uphold the principles and practice of academic honesty, faculty members at OHSU may use originality checking systems such as Turnitin to compare a student’s submitted work against multiple sources.

To protect student privacy in this process, it will be necessary to remove all personal information, i.e. student name, email address, student u-number, or any other personal information, from documents BEFORE submission.

Use Of Sakai: This course will have an online component, which can be accessed through Sakai, OHSU’s online course management system. For any technical questions or if you need help logging in, please contact the Sakai Help Desk.

Hours: Sakai Help Desk is available Mon – Fri, 8 am – 9 pm and weekends 12 pm – 5 pm Pacific Time.
Contact Information:
(Toll-free) 877-972-5249
(Web) http://atech.ohsu.edu/help
(Email) sakai@ohsu.edu