MAP 4484/5489 Mathematical Modeling in Biology

Instructor: Sergei S. Pilyugin
http://people.clas.ufl.edu/pilyugin/courses/map4484_s2015/

Announcements:
The textbook “A course in mathematical biology” is available on Google Books.

Prerequisites:
MAP 3002 (grade C or better).

Time and Room:
MW 6 (12:30 a.m – 1:40 p.m.), LIT 207.

Final Exam Time and Room:
Apr. 30, 12:30-2:30 p.m., LIT 207 (the final exam is optional).

Literature:

Further reading:

Critical dates:
Jan. 6 (classes begin), Apr. 22 (classes end), Midterms: TBA.

Holidays:
Jan. 19 (MLK Day), Feb. 28 – Mar. 7 (Spring Break).

Office Hours:
MW 7 (1:55-2:45 p.m.) in LIT 458, or by appointment. Please, call me at 352-294-2326 or use e-mail: pilyugin@ufl.edu for communication. For more details, see my schedule.

Weekly Schedule:
W1: Basic modeling concepts;
W2-3: Population models in discrete and continuous time. Mathematical and Hegelian growth;
W4: Biostatistics and complex systems;
W5-6: Competition, mutualism and predator-prey models;
W7: Infectious diseases: SIR, SIRS, disease control;
W8-9: Biochemical kinetics: activation/inhibition and cooperation;
W10: Partial differential equation models: age structured models and reaction-diffusion equations;
W11-12: Stochastic models: Markov processes, linear and nonlinear birth-death processes, branching processes;
W13: Introduction to cellular automata;
W14: Introduction to game theory.

Grading System:
Two midterms will be given. The dates of the midterms will be announced at least a week in advance. Midterms will be closed book, scientific calculators allowed.

Homework problem sets will be collected and graded. Some homeworks may require elementary computer skills (using such computer algebra systems as MAPLE, Mathematica, Matlab).

A student may opt to take the cumulative final exam to replace the lowest midterm grade. The final exam may not be used to replace any of the homework grades. Individual grades will be determined as follows. All midterms and homeworks will be graded on a 0-100 point scale. Each midterm is worth 27.5% of the total score, and each homework solution set is worth 15% of the total score. The resulting score (0 – 100 %) determines the letter grade according to the following table:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Score</th>
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<tbody>
<tr>
<td>A</td>
<td>93</td>
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<tr>
<td>A-</td>
<td>88</td>
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<tr>
<td>B+</td>
<td>83</td>
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<tr>
<td>B</td>
<td>74</td>
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<tr>
<td>B-</td>
<td>69</td>
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<tr>
<td>C+</td>
<td>64</td>
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<tr>
<td>C</td>
<td>59</td>
</tr>
<tr>
<td>C-</td>
<td>54</td>
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<tr>
<td>D+</td>
<td>49</td>
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<tr>
<td>D</td>
<td>40</td>
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</tbody>
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Course policies:
Policy related to make-up exams or other work. There will be no opportunities to make up work not submitted. However, if a student provides a legitimate excuse well in advance, scores will be prorated. Work due after the due date will not be accepted and will be deemed work not submitted.

Policy on class attendance. Requirements for class attendance and make-ups, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/student/attendance.aspx.

University’s honor policy. UF students are bound by The Honor Pledge which states: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.” All work submitted for credit by students at the University of Florida is the student’s own work. Instructors have the right to request a re-examination of assignments at any time and to refer any case of suspected academic misconduct to the Honor Code office.

Homeworks:
Homework Problem Set 1 (due TBA): 2.4.2, 2.4.5-6, 2.4.8, 2.4.15-11, 2.4.13, 2.4.16, 2.4.19.
Homework Problem Set 2 (due TBA): 3.6.3, 3.6.4, 3.6.6, 3.9.11, 3.9.14, 3.9.16.
Homework Problem Set 3 (due TBA): 4.5.1, 4.5.5, 4.5.7.
Review for Test 1
Review for Test 2

Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

For students with disabilities: Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

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