Homework problems will be assigned bi-weekly and selected problems will be graded. Please hand the problems to me before the class begins. You may discuss these problems with other students, but you must independently write up and submit your own solutions. Copying any part of a solution from a book or website is cheating! Students are expected to abide by the Georgia Tech Academic Honor Code.

Late homeworks will not be excepted, but you may drop your two lowest homework grades. Emailed homeworks will only be accepted with prior agreement of the Instructor - else they will not be accepted.

In order to grade as many problems as possible, your submitted problem sets should be sequentially numbered, neatly printed on ruled paper, and stapled. Please do not cross out. Write on only one side of each page and do not use paper that has been torn out of spiral bound notebooks. Please print your name on the top of each page. You may typeset your solutions, but I do not consider this a good use of your time. Edit your solutions carefully. Please do not show arithmetic and most algebra calculations. Your solutions should look like the solutions of examples in the text. Five points will be deducted per violation.

Finally, if a problem can be solved without the use of a computer, then no partial credit will be awarded for a computer solution unless it is specifically requested.

Please read all the relevant sections on the textbook.

1. 2.7: 1, 2, 4, 7
2. 3.1: 1, 3
3. 3.2: 2, 4, 5(a), 6
4. 3.4: 3, 4, 6, 14, 16(a)
5. 3.6.6(a)
6. 3.7.4
7. 4.1:1, 2, 3, 8
8. 4.2: 1
9. 4.3: 3, 4, 7
10. Nondimensionalize the following ODEs (from Ecology and Fisheries Management):
    - \( \frac{dn}{dt} = rn(1 - \frac{n}{K}) \)
    - \( \frac{dn}{dt} = rn(1 - \frac{n}{K}) - hn \)
    - \( \frac{dn}{dt} = rn(1 - \frac{n}{K}) - a \frac{n^2}{n^2 + b^2} \)
11. Start reviewing material from Math 2403 on the phase portraits of linear systems of ODEs in the plane (2 \times 2 matrices). Quick reviews can be found on the class links webpage. In particular,
    - Review matrix theory of 2 \times 2 matrices (trace, determinant, characteristic polynomial, three types of roots, eigenvalues, eigenvectors, diagonalization procedure, Jordan Canonical Form for 2 \times 2 matrices)
    - Review the complete classification of the dynamics of non-singular linear systems of ODEs defined by 2 \times 2 matrices.