**Math 113A Suggested Syllabus**

**Text:** *Explorations of Mathematical Models in Biology with MATLAB, 1st edition,*

by Mazen Shanin

&

*Class Notes on Discrete Time Models in Biology*

|  |  |
| --- | --- |
|  | **Main Topics** |
| 1 | Modeling with Difference Equations and MATLAB |
| 2 | 1st Order Equations: fixed points, stability, logistic equation, population growth. |
| 3 | 2nd Order Equations: Fibonacci rabbits, external forcing, variation of parameters. |
| 4 | Systems of Linear Equations: matrices, eigenvalues, red blood cell production modeling. |
| 5 | Markov Chains: transition matrices, population and genetic models. |
| 6 | Systems of Nonlinear Equations: interacting species and infectious disease modeling. |

**Note:** MATLAB is necessary in homework assignments. For MATLAB setup and access, go to

<https://www.oit.uci.edu/help/matlab/>