

Syllabus

Mat 351, Mathematical Methods for Genetic Analysis

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Text: Durbin, Eddy, Krogh, Mitchison, *Biological sequence analysis*.

Additional books:

- D. Gusfield, *Algorithms on strings, trees, and sequences*.
- W. Ewens, G. Grant, *Statistical Methods in Bioinformatics*.

Some of the introductory material will be from other books and so it is essential to attend the lectures.

Homework and Quizzes: There will be suggested homework problems every two weeks a short quiz will be given. No make-up quizzes will be given under any circumstances but the lowest quiz score will be dropped.

Tests: There will be two in-class tests. No make-up test will be given unless a student has notified the instructor before the test date. Tests' dates are:

- Test 1, October, 06.
- Test 2, November, 21.

Final: The date of the final is December 12, 12:20-2:10.

Project: There will be a project on the topic of your choice. Your project can be of the following two types:

- Implementation of some of the algorithms discussed in class.
- Theoretical study of a chosen topic.

In both cases, a written report (5 pages double spaced) must be submitted. Project is due **November 12**.

Grading: Your final grade will be computed as follows:

Quizzes: 20 %, Final 30 %, Tests 40 %, Project 10 %.

Grading scale: A: above 90%, B: 80% - 90 %, C: 70% - 79%, D:60%-69%.

Notes:

- ✓ It is important to realize that all the above rule are approximate, dates of tests are tentative and can change.
- ✓ You are encouraged to implement algorithms discussed in class.

Tentative schedule:

<i>Date</i>	<i>Section</i>	<i>Topics</i>
08/25/03		Functions, vectors, and matrices
08/27/03		Combinatorics
08/29/03		Graphs
09/03/03		Probability 1
09/05/03		Probability 2
09/08/03		Big Oh notation and basic algorithms
09/10/03		Basic Algorithms
09/12/03		Recursive algorithms, Dynamic programming
09/15/03		Review
09/17/03		Longest common substring
09/19/03		String matching algorithms
09/22/03	2.1, 2.2	Chapter 2
09/24/03	2.3	Chapter 2
09/26/03	2.3	Chapter 2
09/29/03	2.4	Chapter 2
10/01/03	2.5, 2.6	Chapter 2
10/03/03	2.7, 2.8	Chapter 2
10/06/03		Review
10/08/03		Test 1
10/10/03	3.1, 3.2	Chapter 3
10/13/03	3.2	Chapter 3
10/15/03	3.3	Chapter 3
10/17/03	3.3	Chapter 3
10/20/03	3.4, 3.5	Chapter 3
10/22/03		Applications or Review
10/24/03	6.1, 6.2	Chapter 6
10/27/03	6.3	Chapter 6
10/29/03	16.1-16.5	Maps and Mapping
10/31/03	16.6	Mapping
11/03/03	16.7,16.8	Mapping
11/05/03	16.9,16.10	Mapping
11/07/03	16.11-16.14	Map alignment
11/12/03	16.15,16.1	Sequence assembly
11/14/03	16.17	Shortest Superstring
11/17/03	16.18	Hybridization
11/19/03		Review

