1. Basics of Counting
   - Counting strings. For example string over alphabet \(A, C, G, T\) of length 40 with (1) exactly 20 \(a\)’s, (2) at most 2 \(a\)’s, (3) at most 98 \(a\)’s, (4) two consecutive \(a\)’s.
   - Basic recurrence relations.

2. Graph Theory
   - Definition of a graph. Finding the number of edges of a graph.
   - Sequencing by hybridization.

3. Probability Theory
   - Basic probability using counting.
   - The random string model.
   - Conditional probability, independent events.
   - The posterior probability and Bayes’ formula.

4. Alignment
   - The dynamic algorithm for finding an optimal global alignment of two strings (with linear gap penalty).
   - Local alignment problem.
   - The dynamic algorithm for finding an optimal local alignment of two strings (with linear gap penalty).
   - Time complexity of the above algorithms.