

COURSE ANNOUNCEMENT FALL 2005

Introduction to Computational Molecular Biology

BIO/MAT 394

Course Description: Due to the large volume of data generated by genome sequencing and cellular measurements of gene expression changes, computer science and mathematics have profoundly changed the science of modern biology. Computational and mathematical methods are now critical to the development of both experimental and analytical tools in genomics. This course will provide students from all disciplines with an introduction to some of the basic mathematical and computational tools that have been developed to analyze, model, and understand these biological data. The mathematical topics will consist of discrete mathematics and probability; however, the emphasis of the course is on algorithmic techniques applied to problems motivated by molecular biology and genetics. In particular, the course will focus on sequence alignment algorithms, hidden Markov models, and computational approaches to genetic and physical mapping, DNA sequencing, and phylogenetic reconstruction. Computer lab sessions will be incorporated to implement some of the main algorithms and introduce a variety of commonly available software packages for problem solving. For example, NCBI databases, tools such as BLAST, and software packages for tree reconstruction will be covered.

Instructor: Sharon Crook, Dept. of Mathematics and Statistics & School of Life Sciences, sharon.crook@asu.edu

Prerequisites: MAT 294 (Quantitative Reasoning in the Life Sciences) or MAT 119 or MAT 243 or STP 220

Additional Information: 3 credit hours meeting Tuesday and Thursday with a \$50 course fee for use of the CBS Program computer room, LSE 236. Course capacity is 24 students with preference given to MARC and pre-MARC students.

This course satisfies the general studies computer science requirement for students in the College of Liberal Arts and Sciences. This course also satisfies the MAT 351 requirement for students in the MBB Program.