Bioinformatics, which combines biology with computer science, is one of the fastest growing disciplines in biological research and in computer science research today. This discipline arose out of a need to rapidly expand and critique large volumes of biological data, especially in the area of genomics. Modern biological and biomedical research involves a significant informatics component. Traditionally, computer programmers have been educated in Computer Science, and biologists have been educated in Biological Sciences or Environmental and Plant Biology. But, it is becoming increasingly evident that to meet the growing need for people working in biological research and industry, a plan of study that focuses on the interdisciplinary aspects of bioinformatics is crucial. No single department can handle this demand. Thus, a certificate program in bioinformatics would make a natural advance in our educational programs.

The certificate program is designed to address a need for students to understand how computer programs can be used/developed to analyze the massive amounts of data currently being generated in almost all areas of biological study. Students will be required to take a total of 32-35 credit hours for the certificate. Many of the courses will satisfy major requirements, and the extra courses should amount to the equivalent of a minor. For any biology major, roughly 22 hours of the core courses and 18 of the prerequisites would apply to the major. The converse is true of the computer science majors with roughly 22 hours of core courses and 20 of the prerequisites satisfying major requirements.

**Prerequisites**

1. Students will be accepted into the certificate program in bioinformatics if they have successfully completed (with a grade of ‘C’ or better) an introductory series in biology (PBIO 114 OR BIOS 170), in computer science (CS 240A and CS 240B) and in mathematics (MATH 263A OR MATH 266A).
Required Courses

I. Core Biology Requirements (choose one from each group)
   A. Genetics
      PBIO 330 Plant Genetics (5) or
      BIOS 325 Genetics (5)
   
   B. Cell Biology
      PBIO 431 Plant Cell Biology (3) or
      BIOS 320 Cell Biology (4)
   
   C. Laboratory practicum
      PBIO 301 Lab CaMPP (3) or
      BIOS 322 Animal Cell Biology Lab (2) or
      BIOS 326 Laboratory Genetics (3)

II. Mathematics/statistics (choose one course)
   CH E 408 Engineering Experimental Design (3) or
   EE 371 Applied Probability and Statistics for Electrical Engineers (4) or
   PSY 221 Statistics for the Behavioral Sciences (5) or
   MATH 250 Intro to Probability and Statistics (4) or
   PBIO 415 Quantitative Methods in Plant Biology (5)

III. Core Computer Science (choose two)
   CS 300 Introduction to Discrete Structures (5) and EITHER
   CS 361 Data Structures (5) or
   MATH 387 Quantitative Foundations of Bioinformatics

IV. Bioinformatics Capstone Courses
   PBIO/CS 416 Problem Solving using Bioinformatics Tools (4) and
   CS 417 Programming in Bioinformatics (4)

Students are expected to earn a 2.0 GPA overall and a 2.5 GPA in the required courses for
the certificate to remain in the program. Students will earn the Certificate in
Bioinformatics upon completion of all of the required courses.