BIOL 478

Term: SPRING 2016  
Course No. & Section: BIOL 478-01

Course Title: **MOLECULAR BIOLOGY OF THE GENOME**

Professor: **DR. KAM DAHLQUIST**

Course Description (principal topics covered):

Objectives:
- To understand gene and genome structure and the genetic code
- To understand the basic mechanisms involved in the central dogma of molecular biology
- To understand how molecular biology exploits the basic functions of microorganisms and enzymes, turning them into tools
- To understand the basic biochemical properties, structures, and laboratory manipulation of DNA, RNA, and enzymes
- To become proficient in the laboratory techniques of molecular biology and genomics
- To maintain a neat and complete laboratory notebook
- To apply bioinformatics techniques for data analysis and manage bioinformatics data effectively
- To read and critically evaluate the primary scientific literature
- To discover, examine, and practice the personal qualities needed to succeed in science
- To learn and follow the ethical code of conduct for the scientific community
- To gain the confidence that you could walk into any molecular biology lab and begin performing independent research

Contents:

The completion of the Human Genome Project 50 years after Watson and Crick first described the structure of DNA marks a fundamental shift in the way we view ourselves and practice biology. This course will examine the fundamental concepts in molecular biology required to understand the biotechnology that has brought us to the genomics era and beyond. In the laboratory, students will become proficient in the basic techniques of molecular biology and then will get to work with cutting-edge genomics technology. Students will design and carry out a DNA microarray experiment. Students will then use bioinformatics tools to analyze their DNA microarray data and to model biological pathways and networks. By the end of this course, students will be working independently on a research project.

Prerequisites/Recommended Background:
- a) Upper division Biology, Biochemistry, or Chemistry major.
- b) Biology 112 (General Biology II Laboratory), Biology 202 (Genetics), Chemistry 220 (Organic Chemistry I)

Required Texts/References:
- Papers from the primary literature TBA

Course Work/Expectations:
- 2 lectures, 2 lab meetings per week
- Weekly homework assignments
- Daily pre-labs and weekly post-labs
- 1 midterm exam (written and practical)
- Final exam (written and practical)
- 1 Final written laboratory report

Comments:
- Fulfills upper division Molecular Biology requirement; fulfills Information Literacy flag for the Core