BIOL 398-03

Term: SPRING 2016  
Course No. & Section: BIOL 398-03

Course Title: MICROBIAL GENOMICS LAB

Professor: DR. MICHELLE LUM

Course Description (principal topics covered):

Objectives:
- To learn the general concepts in microbiology which have emerged from genomics
- To solidify the understanding of the gene-protein-pathway relationship, operon structure, conserved DNA sequences involved in gene regulation, and lateral gene transfer
- To gain familiarity with bacterial genetics, mutagenesis, mutant screens, and molecular techniques
- To learn how to use various sequence analysis computer programs
- To learn how to analyze DNA and protein sequences for similarity, evidence of coregulation and synteny, and evidence for lateral gene transfer

Content:
In this lab, students will be learning and using the tools used in microbial genomics in a semester long research project. Students will work with the recently sequenced organism, *Burkholderia unamae*, a nitrogen-fixing bacterium that interacts with plants. A functional genomics approach, which will involve extensive use of molecular techniques, will be used to generate bacterial mutants that will then be analyzed. Part of the project will also involve computer annotation of specific pathways of *B. unamae*.

Methods used:
Microbiology methods such as aseptic technique, bacterial growth on selective and differential media, selection and screening for bacterial mutants, biofilm assays, plant inoculation assays. Molecular methods such as mutagenesis, genomic DNA isolation, primer design, PCR, restriction digests, gel electrophoresis, plasmid preps, bacterial transformation, DNA sequencing and analysis.

Prerequisites/Recommended Background:
Upper division standing in Biology
BIOL 201, 202

Required Texts/References:
Lab manual and assigned readings in the original literature

Course Work/Expectations:
Assignments/quizzes
Proposal & project report – lab
Keeping a laboratory manual
Final oral presentation

Comments: