

BISC 678 – Topics in Environmental and Applied Microbiology – Fall 2014
MICROBIAL COMMUNITY BIOINFORMATICS

Instructor: Dr. Colin Jackson

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Email is the best way to reach me and I'll generally reply quickly. You can also just stop by my office (506) or research lab (513) – I'm usually around.

Course Title and Description: Topics in Environmental and Applied Microbiology (BISC 678) “Microbial Community Bioinformatics”. Credit 3 hours. An introduction to approaches and bioinformatics pipelines used in the analysis of DNA sequence data obtained from microorganisms in environmental samples.

Aims and/or Purpose of the Course: To give graduate students a solid foundation in the methods used to work with microbial community sequence data.

Course Objectives: 1. To expose students to general concepts and ideas relating to the diversity and distribution of environmental microorganisms. 2. To familiarize graduate students with different molecular approaches that have been used to study microbial communities. 3. To train graduate students in the bioinformatics techniques used to study and analyze environmental microbial sequence data.

Course materials: There are no required course materials to buy. I'll be using Blackboard to post readings and assignments so make sure that you are familiar with how to access and use Blackboard. Almost all of the assignments will require computer use so having your own laptop which you can bring to class would be very useful. However, many of the analyses will be done using online interfaces so having access to a PC or Mac outside of class will be sufficient.

Attendance: If you miss a class period you may miss a large amount of material. If you have to miss for valid reason, let me know asap and we can probably schedule a time for me to run through the material with you. When you're in class I expect you to focus 100% on this course. That means no reading the newspaper, no studying for something else, no sleeping, no cell phones, no calls, and no texting, tweeting, facebooking etc.

Grading:

Ongoing assignments	50%
Class participation/discussion	25%
Final exam	25%

We'll use a standard grading scale of 90 (A), 80 (B), 70 (C), 60 (D), 60 (F) with no plus/minus grades.

Make-up policy/late assignment policy: The only exam is the final (which will be take-home) so there should be no missed exams. Assignments are due on the date listed and for each day late I'll deduct 10% from that assignment, unless you have already cleared it with me beforehand (e.g. because you'll be away at a conference etc.). The same late policy applies to the final (I'll deduct 10% for each day late).

Participation/discussion: Most weeks we'll read a paper or two related to the topic we're covering. Each week we'll have a different person lead the discussion but I expect everyone to contribute something. Don't think of these as formal discussion sessions – more as an informal way for you to ask questions, make comments on the paper etc. You're also encouraged to ask questions etc. any time during class.

Bisc 678 – Microbial Sequence Analysis – Fall 2014
Tentative Schedule of Topics

Introduction to microbial diversity and molecular methods

Sequencing – sequence data, FASTA files etc

Basic processing – GenBank, BLAST

Concept of alignments

Greengenes – NAST

Trees

Diversity measurements

Clone library frequencies

Unifrac

Next generation sequence analysis/Introduction to mothur (this last topic will occupy approx. the last half of the semester)