Computational Genomics 5509, 3 credits
Instructors: Jody Hey and David Liberles
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Office Hours: Please email to arrange office hours or meetings with the instructor when none have been announced.

Course Meeting Time and Location: T 5:30-8:00, BioLife 237

Course Goals: This is a course on the application of genome-related concepts to genome sequence data. Students will gain familiarity with both existing software and with basic programming (scripting) skills for problems in genomics. Further, students will come to understand the connections between standard computational and statistical approaches and their underpinnings in those fields increasingly dominated by genomic approaches. The course will be a hands-on computational lab course, with students working on problems and assignments in class using their laptop computers. The programming language Python will be used for most of the course.

Lecture Topics (Draft):
Jan 12 Lecture 1: Python and Shell Scripting
Jan 19 Lecture 2: File Types and Manipulation/pipelines
Jan 26 Lecture 3: More Python, Shell Scripting, and File Type Manipulation II
Feb 2 Lecture 4: Genome Assembly I
Feb 9 Lecture 5: Genome Assembly II
Feb 16 Lecture 6: Genome Assembly III
Feb 23 Lecture 7: Gene Finding and Genome Annotation
Mar 1 Spring Break
Mar 8 Lecture 8: MySQL
Mar 15 Lecture 9: Databases- UCSC, ENSEMBL, NCBI
Mar 22 Lecture 10: BLAST and Genome Functional Annotation
Mar 29 Lecture 11: GO and KEGG and enrichment analysis
Apr 5 Lecture 12: Alignment (Models and Indels; DNA and Proteins; Local and Global; Dynamic Programming (Pairwise), Multiple)
Apr 12 Lecture 13: Phylogenetic Methods and Manipulating Phylogenetic Trees
Apr 19 Lecture 14: An Introduction to R

Projects/Grading
Each lecture will include a problem set, where all problem sets will contribute equally to the grade.

Course attendance is expected. If you are not able to attend a class please email the instructor ahead of time. Students will be responsible for knowledge provided and problem sets assigned during missed classes.

Course Text: Bioinformatics Data Skills by Buffalo.
Available online thru Temple libraries:
http://proquest.safaribooksonline.com/9781449367480
**Course Technology Requirement:** Students are expected to have a laptop computer in good working order and to bring that to each class.

**Reading Materials** will include primary literature readings, as well as readings from the text indicated in email messages to students.

**Required Disability Statement:** Any student who has a need for accommodation based on the impact of a documented disability, including special accommodations for access to technology resources and electronic instructional materials required for the course, should contact me privately to discuss the specific situation by the end of the second week of classes or as soon as practical. If you have not done so already, please contact Disability Resources and Services (DRS) at 215-204-1280 in 100 Ritter Annex to learn more about the resources available to you. We will work with DRS to coordinate reasonable accommodations for all students with documented disabilities.

**Required Statement on Student and Faculty Academic Rights and Responsibilities:** Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02) which can be accessed through the following link: http://policies.temple.edu/getdoc.asp?policy_no=03.70.02.

**Link to Temple Technology Usage Policy:** https://computerservices.temple.edu/technology-usage-policy

**Academic Honesty:** See http://www.temple.edu/grad/policies/ All worked turned in will be examined by instructors, and by plagiarism checking software. Students found to have plagiarized will fail the course and be reported to the Office of Student Conduct of Temple University. Regarding online postings, students do not have permission to publish or post any classroom materials to online sites.