Biology 456 – Computer Skills for Biologists
Course Syllabus for Fall 2014

Professor: Dr. James A. Foster
885-7062 (but email is better)
foster _AT_ uidaho _DOT_ edu

Guest instructor: Dr. Celeste Brown

TA: Daniel Caetano da Silva, BCB PhD student

Summary: This course develops skills to manage and analyze complicated datasets such as those in molecular evolution, systematics, (meta)genomics, and transcriptomics. Datasets in biology are growing explosively, so computational skills are vital for graduate studies and technical careers in the life sciences. This course will use demonstrations, exercises, and student projects to learn advanced Unix skills, Python programming, and data management. This course is explicitly designed to prepare students for independent research in computational biology and biological sciences and will be helpful for those students taking CS 515, Computational Biology, Sequence Analysis; Biol 421, Advanced Evolutionary Biology; Biol 444, Genomics; or Biol 545, Principles of Systematic Biology.

Requirements: Stat 251 and Biology 210, or permission of instructor, class is strictly limited to the first 24 students

Class Hours: Tuesday 12.30pm to 2.00pm and Fridays 1.30pm to 3pm, LSS 440 (IBEST Classroom), or as posted

Website: Course website: http://computerskillsforbiologists.wordpress.com. You are responsible for checking regularly for reading materials, exercises, and exams.

Format: Lectures, demonstrations, and hands-on exercises on computer workstations, and student discussion. There will be regular homework assignments–usually online tutorials. Graduate students will prepare and present a final project, which will demonstrate facility with course materials. Undergraduates will have regular homework.

Grading: Grades will be determined by the instructor based on demonstrated mastery of the material as determined by in-class

activities, exercises, and the final project. *My philosophy is to give you the highest grade that won't embarrass either of us.* My decisions are final.

Course Materials: All course materials will be free and online. The textbook will be *Python for Informatics: Exploring Information*, Charles Severance. The book is available in several formats at *http://www.pythonlearn.com/book.php*. We will also use online tutorials, including *http://wiki.scipy.org/Tentative_NumPy_Tutorial, http://scipy-lectures.github.io/intro/matplotlib/matplotlib.html,* and *http://biopython.org/DIST/docs/tutorial/Tutorial.html*.

Makeup policy: There is none. All assignments and exams must be completed and turned in on time. Plan ahead.

Academic honesty: Anything you turn in must be your own work. I will be very unforgiving of plagiarism. If in doubt, ask me. Use available resources, but cite your sources. Feel free to discuss things online. Discuss and help each other learn the material. But any copying of turned in work from other students or elsewhere will be punished harshly, as governed by Article II of the University if Idaho's Student Code of Conduct (http://www.webs.uidaho.edu/fsh/2300.html). All incidents of academic dishonesty will be reported to the dean of students. Individuals guilty of academic dishonesty will receive a failing grade for the course and may face further disciplinary action. **Don't be evil.**

Civility: Discussions and interactions in class must be kept civil. Offenders will be asked to leave.

Changes: *This course is under development, so details (including the course schedule) may change periodically.*

Tentative schedule of topics

Topic	Wk	Day	Date	Topic	Activities
Introduction	1	T	8/26	Course intro; Basics of bash and unix	
Bash	2	F	8/28	Really helpful commands	
Bash	3	T	9/2	ADH as an example	
Bash	4	F	9/5	Scripting	
Software Engineering	5	T	9/9	git, directory structure, self-documentation, Ipython, Rosalin, resources	Add scripts to git
Python	6	F	9/12	Variables, Expressions, Statements	Ch 2
Computer Science	7	T	9/16	Intro computing, CS, performance, architecture, OS, pipelines/workflows	
Python	8	F	9/19	if/then/else, while; for, loops, subroutines	Ch 3
Computer Science	9	T	9/23	diff langs, hardware, lang types, ...	
Python	10	F	9/26	Functions	Ch 4
Software Engineering	11	T	9/30	Programming style, debugging tips, regression testing	
Python	12	F	10/3	Iteration	Ch 5
Software Engineering	13	T	10/7	pdb and online help	
Python	14	F	10/10	Strings	Ch 6
Python	15	**T**	**10/14**	**Instructor gone NO CLASS**	
Python	16	F	10/17	Files	Ch 7
Python	17	T	10/21	Lists	Ch 8
Python	18	F	10/24	sets, dictionaries	Ch 9
	19	T	10/28	*flexday*	
Python	20	F	10/31	Tuples	Ch 10
Python packages	21	T	11/4	RE package	Ch 11
Python packages	22	F	11/7	**Instructor gone NO CLASS**	
Python packages	23	T	11/11	numpy package	
Python packages	24	F	11/14	matplotlib package, data presentation tips	
Python packages	25	T	11/18	Biopython package	
Python packages	26	F	11/21	Biopython package	
Thanksgiving	27	T	11/25	**NO CLASS**	
Thanksgiving	28	F	11/28	**NO CLASS**	
student presentations	29	T	12/2	Student presentations	
student presentations	30	F	12/5	Student presentations	
student presentations	31	T	12/9	Student presentations	
student presentations	32	F	12/12	Student presentations	
"Final"	33	Th	12/18	**"Final" (10.00 - 12.00)**	