0. Course Description:

The methods, applications, and implications of genomics--the analysis of whole genomes. Microbial, plant and animal genomics are addressed, as well as medical, ethical and legal implications. The lab provides exposure and experience on a range of bioinformatics approaches--the computer applications used in genome analysis.

1. Contact Information:

Professor Matthew MacManes

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Office hours 8-10AM Tu and F
Schedule at `http://genomebio.org/office-hours/` or by email if those times don't work.

2. Lecture: MWF 11:10-12:00PM Pettee Hall 114

3. Lab: Tues 3:40-5:30PM Kingsbury N134

4. Web Resources:

Blackboard: I will use this for grades
Blog: `http://genomebio.org/Gen711/`
#Gen711: I will try to use this hashtag to pass along relevant and or interesting material
Google: everything you'll learn this semester has been discussed on the internet.Use it!
`SeqAnswers.com`: The forums are really great.
Summer Workshop `http://angus.readthedocs.org/en/2014`

5. Assignments and Exams

Weekly Assignments: These are assigned in lab, and typically involve some sort of sequence analysis and short answer questions. There will be 10 throughout the semester worth 20 points each (200pts total). You may work in groups, but you must submit your own report. These will be due 1 week after they are assigned, typically on Tuesday, unless otherwise instructed. **NO late assignments accepted**.

Exams: There will be 2 exams covering both lecture and lab material. Each will be worth 150 points. The dates for these will be October 14 and December 2. Makeup exams will be permitted only under extreme documented circumstances, or by prior approval (>1 week) from Prof. MacManes.

Final Project: The final project will consist of an oral presentation and written report of a topic related to genomics and bioinformatics. Projects must incorporate an implementation of the computational techniques we've learned about. The final project will be worth 200 points (150 written/50 oral). Oral presentations will occur during the last 2 days of class. Written reports will be due on the last day of class. You may work in groups (<5 members), with the understanding that expectations increase with group size, given division of labor. More details will be provided later in the semester.

6. Materials Needed

Required Textbook: Bioinformatics and Functional Genomics 2nd edition by Jonathan Pevsner. It is available on Amazon new, used and for rent. There is a Kindle version if that is your thing! It should also be available in the campus bookstore, but you may pay more there!

Amazon Web services: For lab exercises, we will use the Amazon Computer Cloud (EC2). You will need to set up an account during the first lab, and will be given $100 to pay for the analyses you will run this semester. The EC2 interface will work properly in OSX and Linux operating systems. For those of you with Windows computers, you will need to install a terminal emulator (Cygwin is one option), or use the OSX computers in the computer lab.

USB Drive: I will provide you with a small USB drive on which you will store sequence data. These are you're responsibility, and if lost, will need to be replaced.

7. Grades

The grade scale is: 93-100=A; 90-92.99=A-; 87-89.99=B+; 83-86.99=B; 80-82.99=B-; 77-79.99=C+; 73-76.99=C; 70-72.99=C-; 67-69.99=D+; 63-66.99=D; 60-62.99=D-; Below 60=F

	Maximum Points
Exams	300 points
Final Project	200 points
Homework	200 points
Total	700 Points

8. Course Policies

Student conduct: Honesty is a core value at the University of New Hampshire. The members of this academic community require and expect one another to conduct themselves with integrity. The Student Rights, Rules and Responsibilities handbook (`www.unh.edu/student/rights`) explains UNH's expectation for academic honesty and defines those actions that constitute academic misconduct with regard to exams, homework, plagiarism, computers, etc. The penalty for the first incident of cheating, plagiarism or other breaches of the university's academic honesty policies will be an automatic F grade for that assignment. A second infraction will result in an F grade for the class. The Dean's office will be notified and dismissal from the university could result.

Disability Services for Students: The University of New Hampshire is committed to providing students with documented disabilities equal access to all university programs and facilities. If you have a disability requiring accommodation, you must register with Disability Services for Students (DSS). Contact DSS at 862-2607. If you have received an Accommodation Letter for this course from DSS, please meet with Prof. MacManes privately to review those accommodations.

9. How to get an A

Receiving an A in this shall should be really easy (I mean it!), assuming you follow these basic guidelines.

- Come to class and lab, pay attention, be interactive: Active learning far outcompetes passive, so while coming to class itself is good, interacting/asking questions will be much better.
- Ask questions when your confused. Come to office hours, or schedule a time to meet.
- Don't cram! Study a little, several times per week. You will remember more, and the exams will be less stressful.
- Read the book and use (with caution) online resources.

10. Course Schedule

Week of	Chapter	Topic	Lab
Sept 2	1 & 7	Intro to Bioinformatics and Molecular Evolution	No Lab
Sept 8	2 & 3	Finding Data & Pairwise Alignment	Intro to UNIX & Alignment
Sept 15	4	BLAST	BLAST
Sept 22	5	Advanced Search (BLAT/HMM/others)	HMMER/RepeatMasker
Sept 29	6	Multiple Sequence Alignment	MSA
Oct 6	NIB	Modern High Throughput Sequencing	fastA/fastQ file processing
Oct 13	NIB	Sequence Read Analysis	Exam Given in Lab
		*** Oct 14th EXAM 1 ***	
Oct 20	8	RNA and Transcriptomics	Transcriptome Analyses
Oct 27	9+	Gene Expression	Measuring Gene Expression
Nov 3	16	Genome Evolution	Differential Expression
Nov 10	NIB	Genome Assembly	No Lab - Veterans Day
Nov 17	NIB	Genome Analyses	Genome Assembly
Nov 24	NIB	Population Genomics	Genome Analyses
Dec 1	NIB	Personal and Medical Genomics	Exam Given in Lab
		*** Dec 2nd EXAM 2 ***	
Dec 8	NIB	Ethics & Final Project Presentations	No Lab