

FORS 7094 Introduction to Bioinformatic Tools
Spring Semester 2018

PROFESSOR: Bobby LaRue, PhD
OFFICE: 222
TELEPHONE: 936-294-3202
E-MAIL: bobby.larue@shsu.edu
CLASS HOURS: Monday & Wednesday 10:30-11:50 am
CLASSROOM: CFS 104 and 219
OFFICE HOURS: Wednesdays noon – 5pm (or by appointment)

REQUIRED MATERIALS

A working PC or Mac laptop computer

COURSE DESCRIPTION

This course will cover a survey of freely available tools useful for the parsing and analysis of modern DNA data. This will include, but not be limited to exposure and experience to command line interfaces (and emulated environments); basic programming and use of R, Perl, Python and Java languages; utilization of publically available databases and datasets, advanced population genetics software, and processing data from MPS runs without publically free tools (GATK, SAMtools, etc....)

COURSE OBJECTIVES

1. Master basic use of command line interface operating systems
2. Utilize bioinformatic tools in R, Perl, Python, and Java.
3. Understand how to use publically available datasets and online parsing/search tools
4. Understand the various file formats, and their uses, and how to convert between formats
5. Perform 3D PCA for cluster analysis
6. Understand the uses/advantages/limitations of Structure and Arlequin
7. Utilize GATK and SAMtools to process MPS data and analyze sequence quality with

Lectures

Week	Week Starting	Lecture
1	15th Jan	Introduction & Overview/ Command line interface installation
2	22nd Jan	UNIX/Linux/Cygwin basics and exercises GITHUB
3	29th Jan	Data formats/format conversion tools
4	5th Feb	Publically available databases/datasets/parsing tools
5	12th Feb	Dataset search tools
6	20th Feb	AAFS MEETING
7	26th Feb	Structure and Arlequin
8	5th March	R and CRAN
9	12th March	SPRING RECESS
10	19th March	PCA
		RO curves
11	26th March	MPS data analysis pipeline (GATK, SAMtools, StraitRazr, IGV, ETC...)
12	2nd April	
13	9th April	PERL and CPAN
14	16th April	Python and PIP
15	23rd April	Introduction to Java based tools
16	30 th April	Student presentations
	7th May	EXAMS

Attendance policy

Attendance will be recorded in keeping with University policy. Students are expected to attend class. Class attendance requirements will be followed in accordance with Academic Policy Statement 800401. In accordance with university policy, students will not be penalized for absences of up to three hours as long as examinations and other assigned work have not been missed. If a student is absent it is their responsibility to obtain the class material and remain current with information distributed during class. Occasionally changes in schedule may be announced in class. *These changes apply to all students, even those who were absent from class.* One letter grade may, at the discretion of the instructor, be deducted from students' final grade if they miss more than four classes. There will be no distinctions between "excused" and "unexcused" absences. Students are expected to be on time to class. After the beginning of the class, late students may be counted as absent.

Grading Policy

Final grades will be based upon the following scale: 90 plus average an "A"; 80 to 89 a "B"; 70 to 79 a "C"; and below 70 an "F". Students should not count on a curve of the final grade. The instructor reserves the right to modify the grading scheme to accommodate for a missed test or final examination in extenuating circumstances.

The instructor reserves the right to assign a final exam grade of 0% should he/she deem the absence was not properly handled or was unjustified. Appeals will be handled in accord with University Policy Statement 900823, Academic Grievance Procedures for Students.

Make-up work

If a student is absent from class he/she may not be given an opportunity to make up the work, even if prior notice has been given the instructor. Make-up credit will be at the discretion of the instructor.

COURSE REQUIREMENTS

Examinations and Assignments

Assessment	Scope	Timeframe	Weight of Grade
Basic command line exercises	Defined	Week 4	15%
VCF tools exercise	Defined	Week 7	15%
Structure/Arlequin/PCA exercise	Defined	Week 11	15%
MPS data analysis exercise	Defined	Week 13	15%
Student directed data analysis and presentation	Defined	Week 16	40%

This course is intended to help students become familiar with the basics of bioinformatics and help to understand informatics pipelines. The course will require working through assigned exercises outside of class. These activities will serve as the basis for grade determination in the course.

Deadlines for assignments and other important announcements such as test times and locations will be announced both in class and on Blackboard. As a result, students *must* read their SHSU email and monitor their Blackboard accounts regularly in order to remain current.

Academic dishonesty

<http://www.shsu.edu/administrative/faculty/sectionb.html#dishonesty>

Disabled student policy

http://www.shsu.edu/~vaf_www/aps/811006.html

Services for disabled students

<http://www.shsu.edu/~counsel/sswd.html>

Student absences on religious holy day policy

<http://www.shsu.edu/catalog/scholasticrequirements.html#holyday>

Use of Cell & Smart Phones, PDA's & Similar Devices: Engaging in voice communication using a cell phone or similar communication device during class is prohibited. Leaving the classroom to receive a phone call is prohibited, except with prior approval of the instructor for urgent communications. Device sound alerts should be turned off during class. Engaging in text communication during class is discouraged, although non-disruptive occasional use is permitted. Persistent or extended texting is, however, not allowed. Per University policy communication using any electronic device during an in-class examination is prohibited.

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