1 Course Description

This course is intended as an introduction to the fundamental algorithmic issues that arise in bioinformatics. Emphasis will be placed on problem formulation, where many problems in genomics and proteomics will be seen as graph-theoretic or optimization problems. Primary topics include sequence alignment, phylogeny reconstruction, genome rearrangements, sequence assembly, metagenomics, high-throughput sequencing, and high-performance bioinformatics.

2 My Philosophy on Teaching this Course

My training is in computer science. As a result, that is the unique perspective I bring to this course. In other words, this course focuses on the algorithmic and computational issues that arise in bioinformatics. It is not a course that focuses very much on using different software packages. Instead, I want you to start thinking about the computational engines in the background of your favorite software packages. Hopefully as a result of what you learn in this class, you can actually use your favorite computational tools better.

3 Course Material

Unfortunately, there is no single text that adequately covers the material in this class. Course material will be drawn from books, research articles, and the instructor’s notes.

4 Grading

4.1 Course Components

Your grade will be based on following components.

- **Assignments (15%)** – There will be homework assignments based on the material presented in the course lectures.
- **Midterm and final exams (35%)** – The midterm will be worth 15% of the grade and the final will be 20%.
• **Class discussions (25%)** – In the past, I’ve found that graduate students don’t like to talk. So, this semester we are going to try something new. I’m going to incorporate various activities to get students more engaged. Graduate school is about discussing different viewpoints on various research solutions. And, thinking about new problems that are need in solutions. We will have different activities in the course to help you to become more engaged in the material.

• **Research project (25%)** – An opportunity for you to study a particular area of computational biology in-depth. In particular, I’m interested in learning the state-of-the-art of the field and also your viewpoints on the topic.

5 **Programming Fridays**

Since this is an interdisciplinary course, I do not assume that you know how to program. But, many of you do find yourself having to program in order to get your work done. As a result, if there are any interested students, we can meet on Fridays and learn about programming. The idea is that students will learn programming concepts that will hopefully help them write better programs for their research tasks. The language we will be using on Programming Fridays is Python.

6 **Academic Integrity**

6.1 **Aggie Code of Honor (http://www.tamu.edu/aggiehonor)**

“Aggies do not lie, cheat, or steal nor do they tolerate those who do.” Students are expected to attend all classes, complete assignments on time, and participate fully in class discussions and group projects. Violations will be handled in accordance with the Texas A&M University Regulations governing academic integrity.

6.2 **Plagiarism**

As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without research cannot safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

7 **American with Disabilities Act**

The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities to be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, services for students with disabilities in Room 126 of Koldus Building, or call 845-1637.
8 Modifications to the syllabus

While not anticipated, there may be revisions to syllabus that are required once the semester begins. If this happens, the syllabus will be updated and students notified of the revision promptly. If a revision is made to the syllabus, they will always be advantageous to the student.