

Syllabus  
**Genomic Sequencing and Analysis**  
ISC4XXX

**Instructor:**

Dr. Alan Lemmon  
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Dirac 150-D, BRF 213  
Office hours: MW 1:15-2:30 and by appointment  
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**Prerequisites:**

BSC 2010 or CGS 2060 or ISC 3313 or instructor consent

**Course Webpage**

Course materials will be distributed through a blackboard site dedicated to the course. <http://campus.fsu.edu>

**Catalog Description**

This course will provide students with training in the process of analyzing high-throughput DNA sequence data. After lectures designed to bring students up to speed on the cutting edge DNA sequencing technologies, students will develop and/or apply new algorithms for efficient processing of large amounts of genome-scale data.

**General Format of Course:**

Monday:

Introduction to Problem  
Discuss Possible Solutions

Wednesday:

Describe Published Solution(s)  
Introduce Software/Scripts

Friday (Lab):

Hands-on Experience

**Pre-requisites:** None.

**Schedule of Topics:**

Week 1-2: Sequencing Technologies  
Week 3: Library Preparation

Week 4: Enrichment and Multiplexing  
Week 5-6: Denovo assembly  
Week 7-8: Reference assembly  
Week 9: Hybrid assembly, Midterm exam  
Week 10-11: Sequence Orthology  
Week 11-12: Sequence Alignment  
Week 13-15 Downstream Applications  
Week 16 Semester Project Presentations

\*\*Note that this is a tentative list and is subject to change

## **Objectives:**

- 1) describe, compare, and contrast current methods of DNA sequencing
- 2) assemble genome scale DNA sequence data
- 3) use genome-scale DNA sequence data for downstream applications
- 4) describe the differences between whole genome, RNA-seq and targeted sequencing
- 5) Read, understand, and present a published algorithm used for DNA sequence analysis
- 6) describe algorithms used for DNA sequence analysis
- 7) develop or utilize new algorithms for DNA sequence analysis

## **Grades:**

35% (350 pts) **Attendance and Participation**  
25% (250 pts) **Midterm Exam**  
15% (150 pts) **Student Algorithm Presentation**  
25% (250 pts) **Semester Project**

## **Graduate vs. Undergraduate Expectations**

For independent projects, undergraduates will only be expected to utilize an existing program/pipeline to answer a new question. For project reports, undergraduates will be expected to include, a brief introduction, methods, results, and a brief discussion. Letter grades will be assigned (and curves will be applied) separately for graduate and undergraduate sections.

## **Attendance, Reading Assignments, Participation**

Since this is a hands-on course with no textbook, class attendance is critical.

## **Midterm Exam**

A hand-written midterm exam covering the topics covered in class will

be given half-way through the semester.

### **Student Project**

Students will work in teams to develop and implement a new algorithm/pipeline or utilize in a new way a preexisting algorithm/pipeline. Students will be graded based on written and oral reports, in addition to the design and implementation of the algorithm.

### **Free Tutoring from FSU:**

On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options at <http://ace.fsu.edu/tutoring> or contact [tutor@fsu.edu](mailto:tutor@fsu.edu). High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

### **Syllabus Change Policy:**

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

### **University Attendance Policy:**

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

### **Academic Honor Policy:**

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "...be honest and truthful and...[to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>)

### **Americans with Disabilities Act:**

Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center; and

(2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class. This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact the: Student Disability Resource Center 874 Traditions Way 108 Student Services Building Florida State University Tallahassee, FL 32306-4167 (850) 644-9566 (voice) (850) 644-8504 (TDD) [sdrc@admin.fsu.edu](mailto:sdrc@admin.fsu.edu)  
<http://www.disabilitycenter.fsu.edu>