

BMMB 852

Applied Bioinformatics

Sample Syllabus

Description

The purpose of this course is to provide students with a foundation in the various applications of high-throughput sequencing including: chip-Seq, RNA-Seq, SNP calling, metagenomics, de-novo assembly and others. The course material will concentrate on presenting complete data analysis scenarios for each of these domains of applications and will introduce students to a wide variety of existing tools and techniques.

Objectives

By the end of the course work students will:

- Understand common bioinformatics data formats and standards
- Become familiar with the practice of analyzing sequencing data from various instruments
- Develop the computationally oriented thinking that is necessary to take on large-scale data analysis projects

Lessons

The Lessons will provide you with general background information and practical examples that tie in with the topic. We will share some real life exercises and the homework will give you a chance to apply what you have learned for each lesson.

We will cover five topics throughout the course:

- Core Informatics Competency
- Computational Foundations
- Biological Data Formats
- Statistical Methods and Visualization
- Software Tools and their Applications

Assignments

At the end of each lesson, there will be a homework to assess your comprehension of the content.

Homework will usually fit on one sheet of paper. You will need to show the commands and their output. You additionally can print screens, but please DO NOT print a console output of white text on black background!

Grading

Your grade for the course will be the weighted average of all homeworks and a final project.

The final project (weight-20%) will be similar, but more complex than a typical homework and will require that you use the knowledge of the concepts learned throughout the entire course.

You may work in teams if you wish.

Academic Integrity

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Accommodating Disabilities

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The [Student Disability Resources \(SDR\) website](#) provides contact information for every Penn State campus. For further information, please visit [Student Disability Resources website](#).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: [See documentation guidelines](#). If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

Counseling and Psychological Services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

- [Counseling and Psychological Services at University Park \(CAPS\)](#): 814-863-0395
- [Counseling and Psychological Services at Commonwealth Campuses](#)
- Penn State Crisis Line (Available 24 hrs, 7 days a week): 877-229-6400
- Crisis Text Line (Available 24 hrs, 7 days a week): Text LIONS to 741741

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