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BIOSC 1542 (2224) – Computational Genomics

Spring 2022 Syllabus

INSTRUCTOR

Dr. Miler T. Lee
Office: A518 Langley Hall
E-mail: miler@pitt.edu
Office Hour: TBD, via course Zoom link

Regardless of University operating procedure, the best way to contact the instructor is through email.

CLASS TIME

MW 3:00-4:15 pm

When in-person: 403 Information Science Building

When online: via Zoom.

COURSE OBJECTIVE

BIOSC 1542 will explore the use of computer-aided methods to generate and test biological hypotheses at whole-genome scales. Students will gain both a theoretical and practical understanding of working with genomic data, with a focus on high-throughput sequencing technologies.

COURSE LOAD

BIOSC 1542 is a 3 credit course, which is defined as 2.5 hours of classroom time and an average of 5 hours of outside study per week.

PREREQUISITES

Students are expected to have passed both **BIOSC 1540 Computational Biology** and **CS 0011 Introduction to Computing for Scientists** with a C or better grade. Familiarity with or willingness to learn fundamental molecular biology, mathematical, statistical, and computer science concepts will also be assumed. **If in doubt, please consult with the instructor after referring to the prerequisite topic list distributed in class on the first day.**

COURSE MANAGEMENT

We will be using Canvas, canvas.pitt.edu, to access course materials. If you need help with CourseWeb, contact the computer help desk at (412) 624-HELP.

This course will be held either online via Zoom or in person, depending on University policy; the format on any given day will be listed on the real-time schedule and announced on Canvas. In-person classes will also be simulcast over Zoom, technology permitting. Instruction will be tailored to the in-class experience; however, students should feel free to attend remotely as personal circumstances dictate. Students will not be penalized for remote attendance.

Current University operating policy requires everyone to wear masks indoors. Masks should cover both the nose and mouth. If any student is unwilling to adhere to this requirement, they will be asked to leave.

Changes to modes of instruction and course adjustments will be announced on Canvas as needed.

COURSE MATERIALS

There is no textbook for this course. The pace of computational biology research tends to rapidly render textbooks obsolete. Instead, we will rely on online resources, primary scientific literature, and/or journal review articles to supplement what we learn during

class. These resources will be posted on Canvas as needed.

Many of the in-class and at-home assignments will involve the use of a computer and web resources, LINUX-based tools, and free software that is downloaded and run on the computer. Students can use their own computers or computers in any of the Student Computing Labs located throughout the University, www.technology.pitt.edu/services/computer-labs-and-kiosks. Every student will be given an account to remotely access the Center for Research Computing (CRC) Linux cluster, where relevant software will be pre-loaded. For in-class assignments, **students are recommended to bring a laptop computer to class.** If any student has an issue with access to computing resources, they should consult with the instructor during the first week of class to evaluate their options, such as checking out a laptop from Hillman Library (www.library.pitt.edu/equipment).

EMAIL COMMUNICATION

E-mail will be used in this class for communication, and all e-mail notices will be sent out using the University email addresses available through Canvas. Such notices will also be posted as Announcements on Canvas.

Each student is issued a University email address (username@pitt.edu) upon admittance. This email address may be used by the University for official communication with students. Students are expected to read email sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an email forwarding service that allows students to read their email via other service providers (e.g., Gmail). Students that choose to forward their email from their pitt.edu address to another address do so at their own risk. If email is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University email address. To forward email sent to your University account, go to accounts.pitt.edu/, log into your account, click on 'Edit Forwarding Addresses', and follow the instructions on the page. Be sure to log out of your account when you have finished.

HOMEWORK AND CLASSWORK

(180 pts total, 56% of final grade) This course relies on student initiative to learn both the theory and practice of computational genomics, both in and outside of the classroom. You are encouraged to learn alongside your classmates as you complete your assignments; however, you should physically do (click/type/math) every assignment yourself to prepare for the near-term (quizzes) and long-term (doing comp bio in other contexts).

Assignments are generally due Wednesdays by the beginning of class (3:00 pm Eastern time); however, everyone is automatically granted a free two-day extension until Friday by 5:00 pm, after which solutions will be released. Assignments submitted by the earlier deadline will earn 1 bonus point each.

QUIZZES

(140 pts total, 44% of final grade) There will be eight quizzes throughout the term to reinforce concepts introduced in lectures and assignments. All quizzes will be administered online using the Canvas interface.

Quizzes are open-book and will emphasize conceptual and applied knowledge rather than minutia. Despite this, **quizzes must be completed individually in the time allotted, with no in-person or remote assistance from any person in or outside of the class.**

The first quiz will a **prerequisite quiz**. Understanding the topics in this course will require familiarity with certain molecular biology and mathematical concepts, as well as material covered in the prerequisite courses. To this end, on the first day of class, students will

receive a list of fundamental skills in each of these disciplines, which serves as a study guide for a quiz the following week. It is up to each student to decide whether, based on their performance on this quiz, they satisfy the prerequisites for this course.

Each subsequent quiz 2-8 will focus on material covered in the last homework assignment, but may include topics covered at any point prior, since everything we learn builds on earlier concepts. Of the 7 non-prerequisite quizzes (quizzes 2-8), only the 6 maximally scoring quizzes per student will count toward the final grade.

In lieu of a final exam, everyone will have the option to take up to 4 additional quizzes at the end of the term to demonstrate improved mastery over the concepts covered in quizzes 2-8. These quiz scores, if higher, will replace the original quiz scores.

These policies are subject to change for technological or logistical reasons.

LATE POLICY

In general, late assignments cannot be accepted, to ensure solutions are posted in a timely manner prior to the quiz. If there are circumstances that prevent submission of an assignment, please contact the Instructor. The typical scenario will be for the student to make a good-faith effort to complete and submit the missed assignment when they can, without referring to the solutions – it will not be scored, but will rather make the student eligible to complete an alternate make-up assignment at the end of the term, at the discretion of the Instructor. Also note that bonus points earned throughout the term could offset a missed assignment.

Late quizzes will also not be accepted; however, optional make-up quizzes during the finals period can offset up to 4 missed quizzes.

GRADING

Your final grade will be determined by your total points earned during the class:

Criterion	Points Possible
Homework + classwork	180
Quizzes	140
Total	**320**

Your letter grade is based on your final total point performance out of 320, relative to the class distribution. At minimum, a straight grading scale will be applied, where a performance of ≥90% will be A- or better, ≥80% will be B- or better, and ≥72% will be a C (the lowest acceptable grade for this course to count as part of any BioSci major) or better. However, if the distribution of class performance scores is skewed, the grading scheme may be "curved" in your favor, yielding lower point thresholds for each grade. Grading will never be curved to your disadvantage relative to the straight grading scale.

There are opportunities for bonus points throughout the term. Bonus points are assessed after the grade cutoffs have been set and can potentially increase your final grade by one level (e.g., B to B+), maxing out at an A.

POLICY ON REGRADES

Requests for regrades for any assignment or quiz must be submitted to the instructor in writing via email within one week of grading. The request should explain clearly and concisely why you think the grading was in error – vague or overly verbose explanations will be summarily rejected. Unless the regrade request was due to an error in point addition, the instructor reserves the right to regrade the entire assignment, which may result in additional points deducted from your total.

WITHDRAWAL

Students are expected to do all assigned work and stay current in their studies. If

circumstances arise that prevent a student from staying current with the material, the student may consider withdrawing from the course.

Please note the following dates for the Spring 2020 term:

Jan 21, 2022 – Add/Drop period ends
Jan 28, 2022 – Extended drop period ends (undergraduates only)
Mar 18, 2022 – Deadline to submit Monitored Withdrawal form to Dean's Office

G GRADES

If you wish to petition for a G grade, you must submit a request for this grade in writing to the instructor, and you must document your reason(s). You will be required to make arrangements for the specific tasks that you must complete to remove the G grade. Remember that G grades, according to SAS guidelines, are to be given only when students who have been attending a course and have been making regular progress are prevented by circumstances beyond their control from completing the course after it is too late to withdraw.

COPYRIGHT NOTICE

All course materials (including handouts, lecture slides, assignments, and quiz questions) are the intellectual property of the instructor and/or protected by copyright. These materials are made available to you for your **private use only**. Distribution of any of this material on a website, electronic forum, or physical medium without the instructor's express written permission is prohibited and a violation of the academic integrity code as described above. University policy also prohibits the unauthorized duplication or retransmission of course materials. View the complete policy at www.library.pitt.edu/copyright-pitt.

STATEMENT ON CLASSROOM RECORDING

Classroom sessions may be recorded and posted to Canvas for the sole viewing of enrolled students in this course in this term. Students may not personally record classroom lectures, discussion and/or activities without the advance written permission of the Instructor, and any such recording properly approved in advance is solely for the student's own private use.

ACADEMIC SUPPORT RESOURCES

If you are experiencing difficulty in your studies, you are strongly encouraged to take advantage of one or more of the following resources, where applicable to your personal circumstances:

- **Biological Sciences Undergraduate Advising Office**, A258 Langley Hall, bioadv@pitt.edu, www.biology.pitt.edu/undergraduate/advising-and-support/advisors
- **Arts & Sciences Advising Center**, 201 Thackeray Hall, (412) 624-6444, www.asundergrad.pitt.edu/personalized-advising
- **Academic Success Center**, G-1 Gardner Steel Conference Center, (412) 648-7920, www.asundergrad.pitt.edu/connected-community/academic-success-workshops
- **Student Support Services**, 208-B Thackeray Hall, (412) 624-6588, www.asundergrad.pitt.edu/connected-community/student-support-services
- **University Counseling Center**, Wellness Center - Nordenberg Hall, 119 University Place, (412) 648-7930, www.studentaffairs.pitt.edu/cc/

DISABILITY RESOURCES

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS) www.studentaffairs.pitt.edu/drs, 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this

course. As a reminder, students must schedule testing center services 72 *business* hours prior to a quiz or exam. Students who miss the deadline must take the quiz or exam as scheduled and will not receive any additional time or accommodations.

ACADEMIC INTEGRITY

Cheating and plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, from the February 1974 Senate Committee on Tenure and Academic Freedom reported to the Senate Council, will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the quiz or exam will be imposed. View the complete policy at www.cfo.pitt.edu/policies/policy/02/02-03-02.html.

You may not confer with any person during any quiz.

You must submit for grading only material that is written exclusively in your own words / numbers.

Violation of the Academic Integrity Code requires the Instructor to submit an Academic Integrity Violation Report to the Dean's Office.

TURNITIN

Students agree that by taking this course, all required assignments may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such assignments. Use of the Turnitin.com service is subject to the Usage Policy and Privacy Pledge posted on the Turnitin.com Web site.

CODE OF CONDUCT

We aim for a classroom environment that fosters a safe and productive learning experience. All class participants are expected to treat one another with respect and without bias stemming from background, beliefs, identity, or physical characteristics, among other considerations, in accordance with the University's Nondiscrimination Policy 07-01-03 and the Student Code of Conduct www.studentaffairs.pitt.edu/conduct.