

BIOINFORMATICS AND COMPUTATIONAL BIOMEDICINE TRACK PhD EXAM PROCESS

Offered: Twice yearly –August/September and February/March (as needed)

Prior to being formally admitted to candidacy for the PhD degree, the student must demonstrate fundamental knowledge of bioinformatics and computational biology and a potential for independent research by passing a qualifying exam. The PhD Qualifying Exam aims to evaluate the student's understanding of fundamental concepts and approaches in bioinformatics, computer science, statistics, genetics, and molecular biology and capability to apply the learned methodology to problems in computational biology and to identify areas that need to be strengthened for the student to be successful as a PhD student and independent scholar.

Overview and Timeline

This timeline is based on the completion of the sequence of required courses listed below and a cognate area of study. The test will be taken at the completion of this sequence, typically 24 months after starting the PhD program, and must be passed before completion of year 3.

This is a two-session exam, where each session takes 4 hours. During two sessions, students will have a laptop (provided by the examiner) and paper. During the exam students cannot access notes, books, or other information sources. The exam will be broken into two 4-hour exam sessions that will be administered on two consecutive days. Once the first session closes, the exam will be submitted and can't be revised in the second session. The written comprehensive exam will be followed by an oral exam session within 3-4 weeks.

The Comprehensive Exam will be created by the PhD Qualifying Exam Committee based on questions submitted by faculty teaching the required courses.

Required Courses:

General Exam:

Part 1: Fundamental Algorithms in Bioinformatics and Computational Biology
BMI 650 – Bioinformatics/Comp Bio I: Algorithms (McWeeney, Zheng)

Part 2: Statistical Methods in Bioinformatics and Computational Biology
BMI 651 – Bioinformatics/Comp Bio I: Statistical Methods (McWeeney)

Part 3: Research Methods
BMI 652 – Research in Bioinformatics (Boudreau)

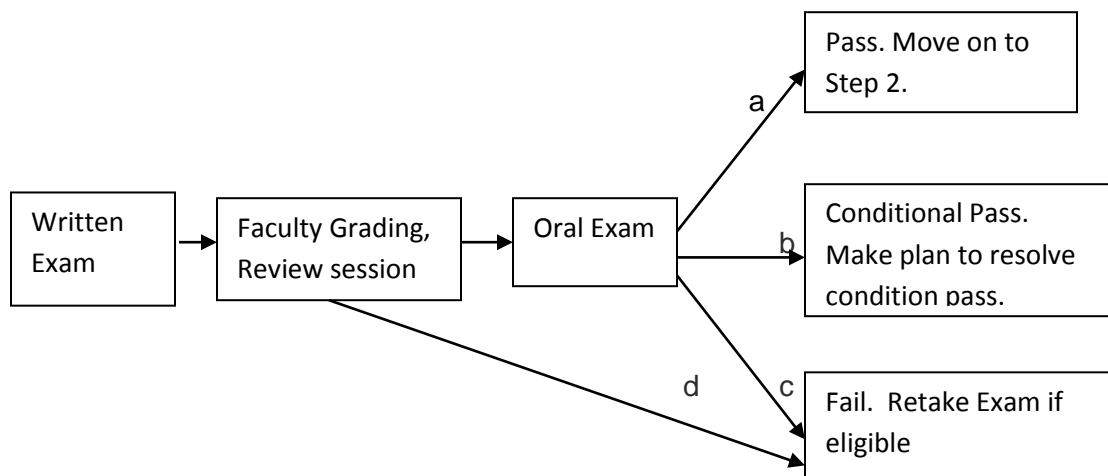
Part 4: Special Topics
Elective

Part 5: Ethics
BMI 676 – Ethics (Valerius)

Cognate and Advanced Methods Exam:

The student will elect and discuss with the Qualifier Committee his/her areas of cognate and advanced methods.

FLOW THROUGH THE QUALIFYING EXAM PROCESS



Possible outcomes from the Qualifying Exam are that the student:

Written Exam	Nature of Oral Exam Session	Overall Outcome	Next Step
Pending (a)	Additional questions; Passed Oral Exam session	Passed	Advance to Candidacy
Pending (b)	Additional questions; Marginal pass of Oral Exam session	Conditional Pass	Must complete condition for passing within 1 academic term.
Pending (c)	Additional questions; Failed Oral Exam Session	Failed	Retake Comprehensive Exam if eligible
Failed (d)	No Oral. Give feedback on areas that need strengthening prior to retaking written exam.	Failed	Retake Comprehensive Exam if eligible

- a. Passed written the Oral Exam Session. If the student presents convincing mastery in the Oral Exam Session, the student moves on to completing Step 2.
- b. Passed written marginally and requires further probing during the Oral Session. After the Oral Exam Session, the faculty feel minor weaknesses (on 1-2 parts only) need addressing before the student can pass. The weaknesses must be resolved within 1 academic term of the exam*. The PhD Exam Committee will outline the conditions the student must fulfill before taking Step 2 (e.g., specific course that must be taken with performance at a specified level; communication skills need to be

improved as evidenced by a presentation, etc.). With the Chair's endorsement, the student will later request a change from "conditional pass" to "pass" after he/she believes that the conditions have been fulfilled. The student will outline in this request the reasons for this belief. The PhD Exam Committee will meet again to act on the request. *Note: if the condition is that a specific course must be successfully completed but it is not offered the next term, the PhD Exam Committee will adjust the schedule.

- c. Passed written marginally and requires further probing during the Oral Exam Session. The student is unsuccessful in answering questions during the Oral Exam Session. The weaknesses are on more than 2 parts OR cannot be resolved in 1 academic term. The student will be given feedback on areas that need additional study before retaking the Comprehensive Exam. The student has one opportunity to retake the written exam either 6 or 12 months following the initial attempt.
- d. Failed the written exam by failing 50% or more of the written exam. There will be no oral exam. The session will focus on giving feedback of areas that need strengthening. The student has one opportunity to retake the written exam either 6 or 12 months following the initial attempt.

Faculty will grade and provide feedback to the track director on submitted questions on the written exam within 7 days of the exam. The exam questions be graded as follows: (Strong Pass, Pass, Marginal Pass, Fail). In cases where the faculty agree that the student has passed all parts, the student is passed. In cases where the student has marginal passes or failures on parts, the PhD Exam Committee will meet in a Review Session to discuss the performance. The students will be notified by email of the outcome of the Comprehensive Written Exam prior to the Oral Exam Session. All students will attend an Oral Exam Session within 3-4 weeks of the initial exam. The examiners, Track Leader, Associate PhD Director will attend the Oral Exam Session.

Qualifying Exam Outcome	Next Step
Passed unconditionally (a)	Advance to candidacy
Passed conditionally (b)	Complete condition for passing
Failed (c)	Retake Qualifying Exam if eligible

- (a) Passed unconditionally; The student advances to candidacy.
- (b) Passed conditionally; In this case, the faculty will outline the weakness and the conditions the student must fulfill before reconsideration (e.g., specific courses must be taken with performance at a specified level; communication skills need to be improved as evidenced by...). With the Chair's endorsement, the student will later request a change from "conditional pass" to "pass" after he/she believes that the conditions have been fulfilled. The student will outline in this request the reasons for this belief. The Exam Committee will meet again to act on the request.
- (c) Failed, with or without option to retake. The student may retake the Qualifying Exam once.