This document supplements the CS Ph.D. Program Milestones Document
https://www.bu.edu/cs/phd-program/phd-program-milestones/.
It specifies the requirements of the Qualification Stage for Computer Science students in the
BUSec group. To determine whether the BUSec track is appropriate, students should consult
their advisors.

Breadth Requirement

The breadth requirement is the same for all students in the department, as specified at
https://www.bu.edu/cs/phd-program/phd-program-milestones/phd-program-breadth/. There are
no additional requirements specific to BUSec.

Depth Requirement (in lieu of the Qualifying Depth Exam)

There is no qualifying depth exam for BUSec students in the computer science department.
Instead, the depth requirement is to complete 3 advanced topics courses on topics related to
BUSec research, each with a grade of A- or higher. Specific courses which can fulfill this
requirement vary from year to year; they must be preapproved by BUSec faculty. Generally,
these will be courses that are not on the Breadth Requirement list and that include both a
significant problem-solving component and a major course project. If a course is deemed to
satisfy both the Breadth Requirement and the Depth Requirement, the same course can be
counted towards both requirements simultaneously. Examples of recently offered courses which
would count toward this requirement include:

CS 548: Advanced Cryptography
CS 591: Privacy in Machine Learning and Statistical Inference
CS 591: Formal Methods in Security and Privacy
CS 591: Communication Complexity
CS 591: Sublinear Algorithms

Directed study courses may also be used toward the depth requirement, when approved in
advance for this purpose by BUSec faculty.

Note: CS 530 (Algorithms), CS 531 (Advanced Optimization Algorithms), CS 535 (Complexity),
and CS 537 (Randomness in Computation), CS 538 (Cryptography) and CS 558 (Network
Security) **do not** count toward the depth requirement.

Oral Qualifying Exam

BUSec students should pass the Oral Qualifying Exam by the end of year three, notwithstanding
the more relaxed departmental requirement for post-BA students.

The oral qualifying exam consists of a student's talk on their original research. The expectation is that this talk will be given as a regular BUSec seminar. In consultation with their advisor, the student should select the topic and an examination committee consisting of the advisor and two other faculty members.

The presentation itself should last 45-60 minutes with roughly 30 minutes remaining for questions from the committee about the presentation, details of the results, and related work. The presentation should explain the new results, situate them within the relevant body of prior work, include a detailed exposition of at least one of the new main results, and discuss possible avenues for further investigation. Students are encouraged to work with their advisor as they prepare and polish the talk.

The committee will then meet to discuss the outcome of the exam. Potential outcomes are:
1) The student passes the exam,
2) The student conditionally passes the exam, but must prepare a short written or oral summary of a specific aspect of the presentation to the committee's satisfaction,
3) The student is given an opportunity to retake the exam the following semester, or
4) The student fails the exam.

Last updated May 12, 2021 by Ran Canetti, Leonid Reyzin, Adam Smith, and Mayank Varia.