

## **QBS Rules and Regulations for PhD Students**

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### **Overview and Statement of Purpose**

The primary goal of the Quantitative Biomedical Sciences (QBS) Graduate Program at Dartmouth is the cross-disciplinary training of students to be highly qualified for productive careers in research and teaching in the quantitative biomedical sciences. Only students who intend to pursue the PhD, the Health Data Science Masters, the Epidemiology Masters, the Medical Informatics Masters, or internal M.S. degree full-time are accepted into the program. The PhD program begins with necessary prerequisites, a set of required courses, and research rotations. Advanced electives are often taken in later years. Training culminates in the production of a publishable dissertation based on original research in the student's chosen field of investigation. Each student is required to work on the dissertation under the supervision of a faculty advisor; this association will determine, to a large extent, the nature of the student's individual

course of study. Students are welcome and in fact are encouraged to devise their own topic. The guidelines that follow have been adopted by the QBS Director, Associate Director, Administration and Program Faculty to ensure that each student completing the graduate program will have acquired the necessary skills and knowledge to be effective in research and teaching in their chosen discipline within the QBS Program.

Note that in the sections following, the term 'first-year student' is used to describe a student entering the program. Under most circumstances a first-year student may not begin satisfying the requirements described in this document prior to the Fall quarter of their first year in the program, however this remains an exception for those accepted to the QBS Masters Program (see section VII). Also, the word 'faculty' where not specified otherwise, refers to QBS Program faculty.

All students are expected to adhere [Dartmouth Academic Policies](#) including the Honor Principle and the Student Code of Conduct as described in the Dartmouth Graduate Student Handbook. (Add diversity statement?)

### **QBS Administration**

QBS is overseen by the Director of the program, the Associate Director, and the QBS Advisory Committee, each position involving a two-year term. The QBS Director and administrative team oversee the daily activities of the program. The QBS Associate Director is second in command and petitions the Advisory Committee for election to said position. If elected, the Associate Director serves a term of 2 years, after which it is expected that they then assume the position of QBS Director. The election of the Associate Director is determined by a majority vote of the Advisory Committee. The Associate Director is essentially the director-in-training and holds distinct and shared responsibilities that aid the QBS Director and Administration of the program.

The Advisory Committee consists of seven members, two from each of the represented disciplines (Bioinformatics, Biostatistics, and Epidemiology) to be appointed with voting privileges by their respective department chairs. The QBS Director is the seventh member serving as the Chair of the Advisory Committee, in an officiating, nonvoting role. The QBS Director will cast the deciding vote in cases of a tie or plurality vote. The Associate Director remains one of the six voting members of the Advisory Committee. The term for all Advisory Committee Members is a minimum of two years. In the absence of the Director, the Associate Director will assume authority of the Advisory Committee and programmatic matters as they arise.

Intention to resign from the committee except under unexpected personal or professional circumstances, must be expressed to the committee and their respective Department Chair at least 2 months in advance such that a suitable replacement can be found. The Advisory Committee meets at least twice per year at

approximately 6-month intervals or as needed. Decisions regarding major programmatic issues are put to a vote and implemented by the Director, Associate Director, Program Administration and QBS faculty where appropriate. For routine decisions, the Director and Associate Director will act in his or her best judgment. The QBS Advisory Committee also serves as members of the PhD or Masters admission committees in conjunction with selected QBS PhD Student Representatives (Section V), Director Approved QBS Alumni, and Chair approved ad-hoc members appointed to either when necessary.

### **QBS Curriculum Committees**

The QBS Curriculum Committee Chairs are selected from the QBS Advisory Committee and committee composition is established by discipline and specific departments: Epidemiology, Biomedical Data Science, and Bioinformatics. The primary responsibility of each Curriculum Committee is to oversee the quality of QBS courses. They evaluate the content and sequence of the QBS PhD and Masters program curriculum and suggest appropriate modifications to department chairs and the QBS Advisory Committee. All QBS courses that have 4 or more students registered are provided course and instructor feedback through student course evaluations in Banner at the end of each quarter. Feedback is reviewed by the QBS Director of Academic and Student Affairs, the QBS Director, and Curriculum Committee Chairs quarterly. Students may also express concerns about a course to the QBS Administration and Leadership at any time during the quarter. The Curriculum Committee Chairs discuss feedback from courses with Course Directors after receipt. When a concern is raised about a course's quality by the QBS Curriculum Committee Chair, QBS Leadership, or members of the QBS Curriculum Committee, the Chair and the Committee will provide support to the Course Director and relevant Department Chair in creating an action plan for course improvement. The Curriculum Committee and/or department chairs are responsible for evaluating whether the concerns have been sufficiently addressed after the next offering of the course. Curriculum Committees may also identify scientific gaps and market competitiveness; review syllabi, sample lecture slides, and homework assignments from each course when it is first offered by an instructor or substantially modified.

### **QBS Faculty**

Being a member of the QBS faculty carries responsibilities such as attending program seminars, participating in QBS sponsored events, taking QBS students for research rotations, supervising dissertation students, service on program committees, and helping with recruit interviews during our recruiting season.

- A. Becoming QBS Faculty: Members of the Dartmouth community who wish to become QBS faculty must submit their Biosketch/CV as well as a letter of intent to the QBS Administration stating why they would like to join and why they would be a good fit for the QBS program. This information is distributed to the QBS Advisory Committee who must provide a majority affirmative vote for this individual to join the QBS program.

- B. Rotation and Dissertation Students: QBS faculty join the program with the intent to sponsor rotation and dissertation students. It is recognized that this may be dependent on funding in a given academic year. When taking a rotation student, it should be made clear that the faculty member has the appropriate research grant funds or departmental resources at their disposal to fund the costs of the rotation (e.g., expendable supplies), as well as at least three years of funding to support a student stipend and dissertation research. QBS Administration will solicit information from each faculty member in the program regarding their interests in sponsoring rotation students and be guided by this input when assigning rotations. Faculty should expect the average length of PhD candidacy to be at least 5 years. Should funding hardships be encountered after the 6<sup>th</sup> year of study the situation is to be brought to the attention of the QBS Director and Administration for review.
- C. Committees: Faculty are expected to serve on QBS qualifier and QBS dissertation committees if their area of expertise is appropriate to do so. QBS faculty may also be approached by the chairs of their respective departments to serve on the QBS Advisory Committee. Faculty are also expected to serve as ad hoc members on admissions committees.
- D. Mandatory Attendances: QBS faculty are expected to attend:
  - I. Their students Research in Progress presentation as well as those of students whose dissertation committee they are serving on.
  - II. Their students qualifying and dissertation defense as well as those of students whose qualifying or dissertation committee they serve on
  - III. Diversity and Equity training and other training that may be mandated by the QBS program
- E. Other responsibilities
  - I. Participation in the QBS interview process: Interviewing students, providing evaluations, and attending social events
  - II. Attending and participating in the QBS retreat and other yearly QBS community seminars, outreach, and social events

## **I. ADVISING AND RESEARCH REQUIREMENTS**

### **A. Research Requirements for First Year Graduate Students**

In August and September preceding the start of the Fall quarter, entering students will have the opportunity to meet individually with the QBS Administration and members of the QBS faculty. The purpose of this initial meeting is to inform the students of program expectations, regulations, and

courses, as well as to familiarize students with faculty research to begin the process of selecting research rotations. During their first year in the program, students are required to do three research rotations under the supervision of three different program faculty members; each rotation will be of a quarter's duration (i.e. approximately two and a half to three months). Joint faculty rotations may be arranged with the approval of the QBS Administration. Students are strongly encouraged to read papers by faculty whose research is of particular interest to them and to call or write those faculty members during the Summer to discuss the possibility of a rotation. Before the start of each quarter, students are required to submit up to three choices for research rotation advisors, in rank order of preference, to the QBS Administration. Students will then be matched with their research rotation advisor making every effort to give students their first choice. These actions will be performed under the following considerations:

1. Students may perform research rotations only in laboratories of faculty who have made it clear that they have the appropriate research grant funds or departmental resources at their disposal to fund the costs of the rotation (e.g., expendable supplies), as well as at least three years of funding to support a student stipend and dissertation research.
2. Co-Mentorship: Students may perform a research rotation with faculty outside of QBS only in the situation where a co-mentor in QBS is identified for the rotation. Ultimately, this faculty member outside of QBS may be the primary dissertation advisor so long as the co-mentor is still QBS faculty.
3. QBS Administration will solicit information from each faculty member in the program regarding their interests in sponsoring rotation students and be guided by this input when assigning rotations.
4. Realizing that ideas, impressions, attitudes, and expectations change with time, only the first (i.e. the Fall quarter) rotation is to be arranged prior to the beginning of the Fall quarter. The second and third rotations (Winter and Spring quarters) will be arranged during the final weeks of the preceding quarter using procedures identical to those employed for the choosing of Fall quarter rotations.

It should be emphasized that neither the student nor the faculty member is to regard any of the three research rotations as permanent. Students are required to perform three such rotations before finally deciding on a dissertation advisor. Students and faculty are not to arrange the choice of their dissertation lab until the last two weeks of the third rotation; the precise time when it is appropriate to discuss permanent arrangements will be announced to students and faculty by the QBS Administration. Once the dissertation lab arrangements are made, students and faculty will submit an agreement letter, jointly signed, to the QBS Administration Office. A modified form will be used if the student will be co-mentored by two advisors and co-mentored students are required to also provide an outline regarding the agreed division of financial and mentoring responsibilities agreed upon by each advisor.

At the end of each rotation, the research advisor or co-mentors will submit to the QBS Administration a grade of Credit (CR) or No Credit (NC) and a written summary of the student's rotation if desired. A grade of NC for the research rotation is given only if there are serious deficiencies in student performance.

## **B. Dissertation Advisor and Dissertation Committee**

By the end of the Spring quarter of the first year of graduate study (approximately June 1), each student must have arranged for a member of the QBS faculty to serve as their dissertation advisor and research sponsor. Choice of a dissertation advisor may be delayed by one quarter under special circumstances in which a student requests from the QBS Administration a fourth research rotation; in this case the fourth research rotation will occur during the Summer of the student's first year in the program. It is the understanding of student and the advisor, unless otherwise discussed with the QBS Administration, that the 4<sup>th</sup> rotation is intended to be the student's dissertation lab. QBS Administration will set the timeline for this rotation and provide stipend support during this time. If a student is not able to find a suitable or willing advisor from among QBS program faculty at the end of their research rotations the situation will be reviewed by the QBS Advisory Committee who may allow a 5<sup>th</sup> rotation, suggest terms by which a student may leave with a QBS MS degree, or recommend separation from the program prior to the start of the Fall quarter.

The dissertation advisor plus two other faculty members, chosen by the student in agreement with their dissertation advisor, will become the student's Dissertation Committee. The Dissertation Committee is to be formed and approved no later than July 1<sup>st</sup> of the student's second year unless a valid reason for a delay is provided to the QBS Administration. The first committee meeting is to be held before the beginning of the following Winter quarter unless otherwise approved. The student's dissertation advisor will serve as Dissertation Committee Chair. Normally, the Dissertation Committee will be composed only of QBS faculty members. However, where appropriate, one member of the Dissertation Committee may be a non-QBS faculty member. There may be additional members added to the committee as the student's advisor sees fit but at least two members must be QBS faculty. In the case where a student is co-mentored by two QBS faculty, there still must be one additional QBS faculty member on the committee. The committee should be assembled to avoid potential or perceived conflicts of interest between faculty members and between faculty members and the graduate student. Such conflicts would include personal or financial relationships. Final approval by the QBS Director of the composition of the Dissertation Committee is required, as are any subsequent changes in the composition of the committee.

In the event that either the student or the advisor desires to end the student-advisor relationship, then the Dissertation Committee must play an active role advising on the situation and in subsequent matters

pertaining to the student's project, particularly if the decision is not a mutual one between the student and advisor.

If either the advisor or the student wants to end the relationship, then the following must occur:

1. The reasons for the action must be stated in writing and filed with the QBS Administration Office.
2. The Dissertation Committee must be made aware of the issues.
3. The student (or advisor) must be given an opportunity to rectify the problems.
4. The conditions that the student or advisor must meet to rectify the problem should be approved by the Dissertation Committee and communicated in writing to the student and to QBS Administration.
5. If the Dissertation Committee has not been formed, cannot reach a conclusion on the issue, or the problems cannot be rectified, the situation will be brought to the QBS Director and QBS Administration for review.

In the event that a student's advisor leaves the institution, the following options are available to students:

1. If a student has successfully passed their qualifier exam:
  - a. The student may choose to remain in the QBS Program, and transfer to a new lab at Dartmouth. This option requires the naming of a new dissertation advisor from among the QBS faculty. It is up to the student and new advisor if they would like the outgoing advisor to serve on the student's Dissertation Committee.
  - b. The student may choose to continue to work with the outgoing advisor but remain in the QBS Program and work at Dartmouth. In that case, a nominal QBS advisor must be named with the original advisor remaining a member of the student's Dissertation Committee, attending RIPs, committee meetings, and eventually the dissertation defense.
  - c. The student may move with the outgoing advisor to the new institution while remaining a QBS student. The student will be required to name a new QBS and Dartmouth-based advisor in order to enroll in graduate research at Dartmouth each quarter, and to meet all program requirements while studying off-site. The student will be required to return to campus for his/her annual RIP and committee meeting and complete all course requirements. The student may petition the QBS Administration and Director prior to obtain permission to fulfil remaining requirements remotely or receive a waiver of certain requirements such as journal club or teaching requirements.

- d. The student may leave the program with a QBS MS upon QBS Director and QBS Advisory Committee review and approval. This is contingent on satisfactory coursework completion.
2. If a student has set a date for their qualifier defense and submitted a final draft of their written qualifying exam but not yet had their oral defense, the situation will be reviewed by the QBS Director and Administration should the student want to pursue options 1.a.-d.
3. If a student has not yet successfully passed their qualifier exam:
  - a. If the student chooses to remain in the QBS Program, they must transfer to the lab of a QBS faculty member. This option requires the naming of a new dissertation advisor from among the QBS faculty. The student will work with QBS Administration to ensure there is appropriate time for selecting this advisor and taking a rotation if needed. It is up to the student and new advisor if they would like the outgoing advisor to serve on the student's Dissertation Committee.
  - b. The student may be able to leave the program with a QBS Masters upon QBS Director and QBS Advisory Committee review and approval. This is contingent on satisfactory coursework completion.
  - c. The student may withdraw from the QBS Program and follow the lab of the outgoing advisor and join the new institution's program or otherwise.

### **C. Functions of the Dissertation Committee**

The duties and purpose of the Dissertation Committee are to:

1. Attend annual committee meetings arranged by the student, or more frequently as needed to assess progress and address any concerns.
2. Attend the student's annual QBS Research in Progress Presentation
3. Review and sign committee meeting progress reports written by the student summarizing their performance in the program. The report form should include an evaluation or outline of the student's progress in the program and in developing and completing a dissertation research project. This will serve as part of the formal record of the student's graduate education.
4. Advise the student on potential course requirements beneficial to their research progression.
5. Ensure that the student develops the ability to communicate ideas and knowledge to others in seminar-style presentations. This will normally be accomplished through experiences gained in courses, QBS Research in Progress Presentations, lab meetings, conference attendance et.
6. Mediate disputes between the student and advisor. In the event that either the student or the advisor desires to end the student-advisor relationship, then the Dissertation Committee must play an active role, particularly if the decision is not a mutual one between the student and advisor.



It is the responsibility of the student to inform the Dissertation Committee about the dates of their QBS Research in Progress Presentations, to schedule meetings with the Dissertation Committee at least once annually, and to provide a progress report summarizing their dissertation and program progress (template provided by the QBS Administration). The student should use this progress report template as a meeting agenda outline that informs their committee of their research progress to date, classes completed, papers published or in progress, and a timeline of future plans. Once approved by the Dissertation Committee, this report should be signed by the student and all members of the Dissertation Committee and submitted to the QBS Administration. If a student cannot arrange for an annual committee meeting in a timely fashion, they must provide a valid reason to the QBS Administration. If no valid reason can be provided or approved, the student will be placed in unsatisfactory standing and the Graduate Studies Office will be notified, and the situation will be reviewed by the QBS Advisory Committee.

## **II. PROGRAM REQUIREMENTS FOR THE PHD DEGREE**

Upon matriculation to the QBS PhD program there are certain pre-requisites and expectations that are required from first year students. Entering students must have fulfilled the requirement of having coursework in calculus in addition to statistical coursework or experience and programming coursework or experience on their transcript or otherwise stated. Students are expected to arrive in the Fall ready to employ the techniques of calculus (including differentiation and integration of multivariable functions), and that you will be comfortable with programming/scripting languages (procedural and Object Oriented, e.g. in R or Python) and concepts (incl. algorithms, data structures). If students lack any of these skills, or it has been a while since they employed them, they are strongly encouraged to acquire them before the program start. Regardless, every student is required to participate in an R Programming Bootcamp in the weeks prior to the Fall Quarter.

The course requirements outlined below are considered a minimum for the PhD. The Dissertation Committee can recommend that a student take more than the minimum required number of courses in order to provide that student with an academic background appropriate for pursuing research in the student's chosen area of investigation. Students may also petition the QBS Director for credit for courses offered by outside institutions. Should a student wish to take a course not on the approved QBS course list, they must receive pre-approval from the QBS Administration and Director to receive credit.

Students who matriculated Fall 2021 and beyond may not take more than 4 units of course work per quarter unless approved by QBS administration and leadership.

For the Fall Quarter, this unit limit does not include pre-term mandatory courses QBS 103: Foundations of Data Science, QBS 700: Responsible and Ethical Conduct of Research, or QBS 110: Integrative Biomedical Sciences Seminar.

### **A. Required Research Rotations**

Each first-year student is required to perform three research rotations in three different laboratories during the first year in the program. The QBS Administration, based on ranked choices submitted by both students and in accordance with faculty, will make rotation assignments. Each rotation will last approximately three months. Only under approved and special circumstances are 4<sup>th</sup> or additional rotations allowed (Section I.B.).

### **B. Core Course Requirements**

Every student is required to enroll in Integrative Biomedical Sciences Seminar (QBS110) and Foundations of Data Science (QBS 103) which begin upon matriculation and prior to that start of first year courses. Additionally, the Guarini Graduate School requires that all first year graduate students enroll in a first year ethics course (QBS 700). There are six other core course requirements to be completed no later than by the Spring of a student's 2nd year unless otherwise approved: Foundations of Epidemiology I & II (QBS 130 &131), Applied Biostatistics I (QBS 119) or Foundations of Foundations of Biostatistics I (QBS 120) & Foundations of Biostatistics II (QBS 121) ), Foundations of Bioinformatics I (QBS 146) and a choice of either Foundations of Bioinformatics II (QBS 175), Machine Learning (QBS 108), Advanced Methods in Health Services Research (QBS 139), or Decision and Cost Effective Analysis (QBS 140).

### **C. QBS Journal Club**

Attendance at an approved QBS or equivalent Journal Club is required and students must take 9 Journal Club courses (not 8 units) over the course of their PhD candidacy. In years that Scientific Writing (QBS 102) is offered, this may substitute for 1 Journal Club course. Many students opt to take a Journal Club every quarter, except summer, over their first 3 years in the program. It is mandatory that first year QBS students register for the QBS Seminar Series (QBS 270) in each quarter of their first year for the Fall, Winter, and Spring. With approval from the QBS Administration, Independent Journal Club (QBS 193) can count as a required Journal Club requirement but cannot substitute for QBS 270 in the first year. Students wishing to pursue this option must identify a faculty member to serve as an instructor and send the QBS Administration a description that entails the theme and material covered during the quarter. This does not have to include specific papers, but should outline the plan per week and how often the student and instructor plan to meet and review the literature (at least 1- 1.5hrs/week in addition to at least 3 hours per week of out of class work). If multiple students are interested in one Independent Journal Club, these students will need to inform the QBS Administration of their intentions to and only one description/syllabus needs to be sent. All proposal are due on a defined date **before**

**the end of the drop/add period for that quarter.** The faculty member is responsible for tracking and evaluating the student's progress in order to provide a grade to the QBS Administration at the end of the quarter. All QBS Journal Clubs are equivalent to 0.5 units, but total units may vary for Journal Clubs offered through other departments and programs.

#### **D. Elective Requirements**

Each student must earn 3.5 units (matriculation years Fall 2019 to present) worth of elective credits approved by the QBS Administration and Director. A list of approved QBS PhD electives can be found on the website (<https://geiselmed.dartmouth.edu/qbs/qbs-phd-elective-courses/>). Many additional electives in other departments and programs have been approved and students may additionally petition the QBS Administration and Leadership for elective approval of courses 100 level or higher that are taught through other departments. Students may also opt to pursue QBS 195: Independent Study as an elective credit. Students may use this to get credit for pre-approved online courses (students must secure alternative funding as QBS will not cover online course costs). Otherwise the Independent Study in QBS is structured to allow students to explore a subject matter and enhance their knowledge in QBS related fields. The arrangement and a course outline are to be developed between the student and a QBS faculty member prior to the start of the quarter as well as submitted to the QBS Administration **before the end of the drop/add period for approval**. This should reflect 3.3 hours of instruction per week and a minimum of 6.6 hours of student work per week for the entirety of the quarter. The student and faculty will work together to structure the study program and set goals that are to be met by the end of the quarter. The course of study may include, but is not limited to, literature review, seminar attendance, online course material, small projects, conference workshop proposals, paper submissions, and presentations related to the specific field being studied. The faculty member is responsible for tracking and evaluating the student's progress in order to provide a grade to QBS Administration at the end of the quarter

Elective Limitations.

No more than 2 units of QBS 195 (2 Quarters) may count towards the 3.5 units of elective units.

No more than 2 units of Biostatistical Consulting (4 Quarters – 0.5 units each) may count towards the 3.5 units of elective units.

No more than 2 units total of QBS 195 and QBS 123 ) may count towards the 3.5 units of elective units.

#### **E. Supervised Teaching**

An essential element of graduate education at Dartmouth is the experience gained in teaching. Therefore, at least one quarter of teaching is required of all PhD students. In the student's second or third year of study, they will TA one of the QBS courses or electives unless another course has been

approved by the QBS Administration. **Under no circumstances may students opt out of this requirement.** It is **mandatory** for PhD students to attend the DCAL TA Orientation & Training prior to the quarter in which they will TA unless otherwise approved by QBS Administration. In the Spring quarter of their first year, students will be asked to rank their top 3 choices of courses to TA. After consulting with faculty, students will be assigned to TA a course by the QBS Administration. To be eligible to TA a class, a student must have completed that course, unless otherwise approved by the instructor and received a grade of “CT”, “HP”, or “P”, or have taken a similar course that provides them with sufficient background to TA the course. Students will register for QBS 196 as they would a normal course prior to the quarter in which they were assigned to TA. A grade of “CT” or “NC” will be assigned at the end of the quarter in which they are a TA. TAs should be in contact with the instructor regarding specific TA requirements for the course. Communication with the course instructor is key and it is recommended that students and instructors be in communication in the weeks prior to class regarding preparation and expectations. If at any time a student feels as though they are being asked to perform duties beyond the scope of the responsibilities listed below or has concerns, they need to contact the QBS Administration. Generally, TA responsibilities are as follows, but may vary slightly between courses:

- Holding Regular and Consistent Office Hours.
  - It's recommended TAs poll students as to when they are generally available
  - It is strongly suggested TAs do not use personal lab space/office for office hours. If a student would like to arrange a consistent space, please contact QBS Administration
  - Please discuss with the course instructor what the appropriate types of questions are to address during office hours. TAs should be able to ask students who have made no attempt at a problem, come unprepared, or come seeking general information that they are capable of obtaining on their own, to return when they have made their best efforts to achieve a solution
- Managing the course Canvas Site
- Grading Exams and/or Homework
  - Solutions are to be provided by the instructor
  - All final grades are to be reviewed by the instructor
  - Grade grievances should be addressed by the instructor
- TAs are not expected to prepare lectures, lecture in class or design course material unless mutually agreed upon and you wish to do so for the experience
- TAs do not need to attend all lectures unless the instructors provide a valid reason for certain lectures they wish you to be at
- TAs should have timely responses to students and availability to students outside of office hours only at their own discretion

- Teamwork is an essential element as most courses will have two or more TAs
- Please plan to have regularly scheduled meetings with your instructor to keep open communications about expectations, obtain feedback, and address any concerns or questions you may have
- Instructors have been asked to provide their TAs with constructive feedback about their performance as well as any student feedback that was provided on evaluations at the end of the course. Please be proactive about obtaining this
- The expected weekly commitment to a course is 10-12hrs per week.
- TAs for courses that are remote, or on campus with remote components should discuss expectations with the course instructor

Opportunities are available for students wishing to participate in more than one quarter of teaching. However, this requires that adequate teaching positions are available to accommodate the interested student(s) and that their advisor agrees. Please contact the QBS Administration for additional details if interested.

If applicable, TAs are expected to begin their duties no more than one week prior to the start of a course, and they need to be available until the final grades are submitted, normally 1 week after the exam period. If, because of illness or other legitimate reasons, students are unable to meet their teaching obligations in each quarter, they should inform the instructors and QBS Administration so that adequate replacements can be found.

#### **F. Research in Progress Presentations**

Students are required to present a research in progress presentation beginning in their 2<sup>nd</sup> year in the program. On a predetermined day each month, two or three QBS students will present their current research to faculty and peers. This will begin in the Fall quarter with the most senior QBS students presenting first. Each student's advisor should be in attendance and their Dissertation Committee is strongly encouraged to attend. For 2<sup>nd</sup> year students, if the committee is not formed yet, their advisor must be present, and they may extend the invitation to their Qualifying Examination Committee. In the year that the student expects to defend his/her dissertation and receive their PhD, the student must still present a research in progress presentation unless the name of the outside examiner and the defense date have been sent to the QBS Administration Office before the beginning of Fall RIPS. All QBS students are required to attend these presentations and attendance will be tracked. Students may miss two presentations per year, unless a valid reason is provided to the QBS Administration. If a student misses more than two presentations without providing a valid reason, the situation will be reviewed by the Advisory Committee in conjunction with the student's advisor and the student may be placed on academic probation.

## **G. The Qualifying Examination**

Each student enrolled in the PhD program must pass a qualifying examination in order to be formally advanced to candidacy for the PhD degree. This exam has two components: a written research proposal and an oral exam that uses the written proposal as its focus. Specific deadlines pertaining to the exam will be communicated to the students during the end of Summer/early Fall of the student's rising second year and they will be provided with a document to share with their committee that outlines committee responsibilities. The Qualifying Examination topic will be based on the students proposed dissertation project or an approved topic of their choice.

### **The Qualifying Examination Committee and Topic Development**

The Qualifying Examination Committee will be composed of three faculty members who serve as the examining and voting members of the committee. At least two members of the Qualifying Examination Committee must be members of the QBS Program faculty. A third committee member may be Dartmouth or Dartmouth Hitchcock research faculty, but otherwise cannot be external. The student and dissertation advisor will jointly choose two members of the examination committee. They should be chosen based on their expertise in the content areas of the written proposal and for their willingness to interact with the student during the entirety of the process.

- a. The Qualifying Examination Committee should be assembled to avoid potential or perceived conflicts of interest between all parties. Such conflicts would include personal or financial relationships. This committee is not intended to be the student's Dissertation Committee, but if suitable, all members would be allowed to be on the student's Dissertation Committee if approved by the program. As the aims evolve, it may become clear that faculty members who agreed to be members of the Qualifying Examination Committee early during the process are not the best ones to serve on the committee. In these cases, the student, advisor, and Qualifying Examination Committee members should decide on a replacement. If it is found that a committee member is consistently unresponsive during entirety of the qualifying process, causing a delay in the timeline, the student is to bring this matter up with their advisor and the QBS Administration to resolve the issue. One member of the Qualifying Examination Committee may be a faculty member who is not a member of the QBS Program. The student's dissertation advisor will not serve as a member of the Qualifying Examination Committee but the advisor's approval of the topic, specific aims, and the final written proposal are required. The advisor is also required to attend the oral examination. The QBS Curriculum Director will attend qualifier exams upon request and is available to advise the committee should the majority of committee members be unfamiliar with the QBS qualifier process. In cases when the Curriculum Director cannot attend upon request, another member of the Advisory Committee will attend.

- b. The student, advisor, and first two Qualifying Examination Committee members will agree upon one of the committee members to serve as Chair (in cases where a non-QBS faculty member is serving on the Qualifying Examination Committee, that person may not serve as Chair). The student is responsible for meeting all deadlines and for setting a time and place for the oral examination. The Chair is responsible for the conduct of the examination and for the preparation of any required correspondence such as compiling the critique of the written proposal from committee members, and communicating major concerns to the QBS Director and Curriculum Director. The committee Chair should be the main contact point for the student, however they may seek guidance and input from individual members.
- c. The student should develop specific aims for the research proposal. The student is encouraged to interact with his/her advisor and the two Qualifying Examination Committee members already selected in developing and focusing the specific aims. However, the student should be aware that the development of the scientific focus of the proposal is the responsibility of the student. The student should submit the proposal title and specific aims to the advisor and Qualifying Examination Committee members. The specific aims should contain an introductory paragraph (approximately 0.5 pages) that places the actual experimental aims in context. In addition to stating the actual aims of the proposed studies, this section should also describe briefly the experimental approaches to be used either in the introduction or under each aim. With the approval of the Qualifying Examination Committee, the specific aims may be modified as the written proposal is prepared. In its final form, the specific aims will be the first page of the written proposal.
- d. The third committee member will be chosen after the advisor and the two committee members have approved the topic and specific aims. However, if the student, advisor, and the committee would like to invite a 3<sup>rd</sup> member prior to aim development, they may do so. The advisor and Qualifying Examination Committee members should confer and select a third member of the committee. The student may also make suggestions about the selection of the 3<sup>rd</sup> committee member, but the ultimate decision will be between the advisor and committee members. The committee will communicate their choice to the student and the student will then contact this third member inviting them to join the committee. The student is to provide them with the guidelines regarding committee responsibilities, the qualifier timeline, and their specific aims. The 3<sup>rd</sup> committee member may be selected based on their ability to (a) provide additional expertise useful for evaluating the studies proposed; (b) provide new faculty with an early opportunity to participate in the Qualifying Examination process; (c) ensure that at least one member of the Qualifying Examination Committee has extensive experience with the QBS Qualifying Exam. After the 3<sup>rd</sup> member is chosen, students are required to submit the names of the entire committee to the Curriculum Director for approval.

- e. During the period of topic selection and development of specific aims, students are expected to maintain full-time involvement in coursework, teaching, and normal laboratory activities.
- f. In all cases and no later than a defined date in December of the student's second year, the topic and specific aims must be approved by the advisor and the two Qualifying Examination Committee members chosen by the advisor and student. The committee member names, proposal title, and specific aims should be submitted to QBS Administration by a defined date in December. The aims will be reviewed by the students Qualifying Examination Committee, and revision suggestions will be presented to the student. Revised aims are due on a defined date in January.
- g. The following are the criteria for evaluation and approval of the specific aims:
  - i. Is studying and writing about the topic of the proposal likely to be a sound educational experience for the student? Ideally, the Qualifying Examination should enhance knowledge and understanding in fields related to the student's PhD dissertation project.
  - ii. Do the aims address important questions in the field? Ideally the aims should be "hypothesis driven" rather than merely descriptive.
  - iii. Are the proposed methods reasonable and feasible using current technology? If not, has the student proposed new approaches that have a reasonable probability of succeeding?
  - iv. Can the proposed experiments be completed within the timeframe of a student's PhD candidacy?
  - v. Is the style and level of detail of the specific aims appropriate for a grant application?

### **The Written Research Proposal**

Qualifying Examination Timeline:

<b>Mid December</b>	<b>Submit First Draft of Aims</b>
<b>Early January</b>	<b>Committee Provides Aims Revisions</b>
<b>Mid-January</b>	<b>Submit Final Revision of Aims</b>
<b>Mid-February</b>	<b>Submit First Draft of Written Proposal</b>
<b>Mid-March</b>	<b>Committee Returns Revision Comments</b>
<b>Early April</b>	<b>Submit Final Revision of Written Proposal</b>
<b>Early April</b>	<b>Committee Approval or Failure of Final Proposal</b>
<b>Early May</b>	<b>Oral Defense</b>

**\*Students who opt for an accelerated deadline will only be held to the dates provided based on the timeline above**

- a. Preparation of the written proposal. The written portion of the Qualifying Examination is a research proposal written by the student. Once the student's topic and specific aims have been approved, the student will have up to four weeks to complete the written proposal. The proposal should be



written entirely by the student. The written proposal must be approved by the advisor before it may be submitted. The advisor should not approve the proposal if it is difficult to understand due to the writing style, grammatical errors, or a failure to provide sufficient background or experimental detail. The advisor should ensure that the proposal conforms to all formatting guidelines and the length requirements (not more than 7 pages plus references) and that the references include all needed information (including titles). Scientific evaluation of the written proposal is the responsibility of the Qualifying Examination Committee, not the advisor. The written proposal must be submitted to the Qualifying Examination Committee no later than a defined date in February. Furthermore, the entire examination process should be completed as close to May 1st as committee availability allows, and no later than August 1 of the student's second year of graduate work. If the exam is not completed by this time, the student will not be permitted to enroll for the following Fall quarter as a PhD student unless otherwise approved due to extenuating circumstances. During the time when the written proposal is being prepared, students are expected to discuss their research schedule with their advisor since it is understood that writing the qualifying exam will take a considerable amount of time and effort. Students are expected to maintain their coursework and other activities during this time. Note that in writing the proposal, the student may not copy from grant applications or journal articles. This constitutes plagiarism and is grounds for dismissal from the program.

b. Written Qualifying Exam Format and Organization

General Format:

- i. The entire research proposal is limited to seven pages and adhere to NIH Fellowship (F) format (<http://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/format-attachments.htm>). The 7-page limit does not include the reference list. The 7-page limit does, however, include all figures and tables. No materials may be included in any appendix. Proposals exceeding this page limit will be returned to the student without review.
- ii. A font size of 11 point or larger is acceptable. Use of smaller font sizes will result in return of the proposal to the student without review. Recommended fonts: Arial, Garamond, Georgia, Helvetica, Palatino Linotype, Times Roman Numeral, and Verdana. There may be no more than 15 characters/inch.
- iii. The proposal should be single-spaced. There may be no more than 6 lines of type per vertical inch.
- iv. Provide at least one-half inch margins (top, bottom, left, and right) for all pages
- v. All pages should be numbered. The first should be numbered as page 1 and should include the abstract and specific aims.
- vi. A reference list should be included after the research description section. There is no length limit for the reference list. Citations in the reference list should be complete and

contain all authors' names (if fewer than 10 authors and the first 10 authors if more than 10 authors), full title, year of publication, journal, journal volume, and page numbers. The format of the reference list in NIH format could serve as a model, but a specific format is not required. Students are urged to cite original references rather than review articles.

- vii. Citations in the text of the proposal can either be numbered (e.g. as in a *Nature* paper) or use the author/year format (e.g. as in a *Cell* or *Genes & Development* paper). Please see (<http://www.ncbi.nlm.nih.gov/books/NBK7256/>) for guidance.
- viii. Inclusion of relevant figures and tables is encouraged. The figures and tables can be either embedded in the text or placed together preceding the references. In either case, the research description section must not exceed 7 pages including all figures/tables.
- ix. In addition to distributing a paper copy of the written proposal to each Qualifying Examination Committee member, the student should send committee members an electronic copy.
- x. The Chair of the Qualifying Examination Committee should examine the proposal for compliance with format requirements as soon as possible after receiving it. Proposals, which do not adhere to all format specifications, will be returned to the student without evaluation. The Chair should provide written guidelines to the student describing why the proposal is being returned. The Chair should also inform the student about the amount of time available for bringing the proposal into compliance with the format requirements. It is anticipated that most modifications needed to bring the proposal into compliance can be completed in less than a week. This does not constitute the one permitted revision of the written proposal.

#### Organization

The research description should contain the following subsections:

- xi. **Specific Aims.** An introductory paragraph should introduce the topic and provide a very brief background sufficient to place the actual specific aims in context. The specific aims should be listed, and the proposed experimental approaches briefly described. Suggested length: Not more than 1 page.
- xii. **Significance (background).** This section should provide the reviewers/committee members with essential background information to allow them to understand the proposed experiments. This section is not a broad review of the field; instead it should be focused on providing information that will enhance the understanding of the proposed experiments.
- xiii. **Approach.** This section should describe the proposed experiments, specifically the rationale, the methods to be used, and the likely outcomes and interpretations of the experiments. The experimental plan should be divided into sections that correspond to

the specific aims. Students should keep in mind that applications for support from an F31 grant should propose a body of work that can be completed by a single person in a 2-3 year period. In general, the written proposal should provide experimental detail sufficient for the Qualifying Examination Committee members to understand the experimental approaches planned and possible limitations or concerns with using the planned approaches. The proposal should not contain excessive details of standard techniques and approaches. However, some experimental detail may be appropriate when the techniques and experimental approaches to be employed are novel or not widely used. Students should consult the Qualifying Examination Committee Chair if they have questions about how much experimental detail to include. This section may also contain a "Preliminary Results" section since the topic may be based on dissertation research.

- xiv. A timetable outlining what work will be done in each year of the proposal.

Suggested length: 6 pages for significance, innovation, approach, and timeline. The members of the Qualifying Examination Committee will have up to four weeks to evaluate the written proposal but are encouraged to complete review as soon as possible and communicate their decision and critique via the committee Chair to the student, which should be completed no later than a defined date in March. The Qualifying Examination Committee may either approve the proposal or may return the proposal to the student for revision. Revising grant applications is a common part of grant-funded research. The Qualifying Examination Committee should request a revision of the written proposal if the proposal contains significant flaws or if the committee believes that a substantially stronger proposal would result from revision. If the Qualifying Examination Committee requests revision of the written proposal, a written critique of the proposal should be prepared by the Chair by combining the concerns and suggestions from individual committee members. These comments should be organized into **“required revisions”** that must be incorporated into the proposal and **“general comments”** that do not need to be incorporated, but may be grounds for questioning during the oral examination. Members of the Qualifying Examination Committee should NOT individually communicate written critiques directly to the student. The Chair of the committee will merge the individual critiques into one critique, provide committee members with the opportunity to read and comment upon the written critique, revise the critique, and forward the final critique to the student and advisor. The written critique should provide feedback to the student on specific areas where the proposal needs improvement. The student is advised to discuss with the Qualifying Examination Committee Chair how to address the concerns raised in the written critique. If the Qualifying Examination Committee feels that the written proposal is acceptable such that it does not need major revisions, individual committee members may communicate minor concerns to the student orally and may prepare a written critique if they so choose.

### **Evaluation of the written proposal.**

The criteria for evaluating the proposal are the following:

- a. Does the proposal follow the stated guidelines for length and format? If not, the proposal should be returned to the student without review.
- b. Does the Introduction/Background section provide sufficient detail to understand and evaluate the proposed experiments?
- c. Is the rationale for each experiment clearly described?
- d. Is sufficient (but not excessive) detail on methodology provided?
- e. Are potential outcomes and interpretations of possible outcomes described?
- f. Have alternative approaches been considered if the method of choice does not work?
- g. Is the proposal written in a style appropriate for a research grant?
- h. Is the timetable for the work provided by the student realistic?

### **Revision of the written proposal.**

The amount of time available to the student for preparing and submitting a revised written proposal will be determined by the Qualifying Examination Committee, based on the amount of revision needed. This may be as short as three days if only minor revisions are required, and as long as three weeks if major revision is needed. The student is to prepare, in addition to their revised proposal, a response that is **no longer than 1 page** to the critique the Chair has sent them. Only one revision of the written proposal will be permitted. The revised proposal, approved by the advisor, should be submitted to the Qualifying Examination Committee. Prior to the oral examination, the Chair of the Qualifying Examination Committee should consult with the other committee members to determine whether there remain substantial deficiencies in the written proposal. If it is decided that these deficiencies can be addressed during the oral exam, the Chair should inform the student in writing before the date of the oral examination and state briefly what the deficiencies are

Alternatively, if the deficiencies are such that they would have returned the revised written report if it were the first submission, they may choose to fail the written examination. Approval or failure of the final written exam should be communicated to the student no later than 1 week after submission. If failure occurs, the QBS Advisory Committee will convene with members of the Qualifying Examination Committee to determine the next step. The student may be allowed to repeat the qualifier process a second and final time or may be dismissed from the program if warranted based on the student's cumulative body of work.

### **Scheduling the oral examination.**

It is advised students begin to try to book their exam once their 3<sup>rd</sup> committee member is chosen even if their defense will be remote. Arrangements should be made no later than approval of the first proposal

submission. The student should schedule the oral examination and reserve a room with a wipe board for the oral examination, which should take place by May 1, or as soon thereafter as faculty schedules permit. If possible, a room and time should be scheduled a month in advance. A room/time for the oral qualifier examination should be reserved for at least 4 hours although most oral examinations are completed in 2 hours or less.

### **The Oral Examination**

- a. Format for the oral examination. The student should prepare a brief presentation (no more than 10 minutes) of the background to the proposal, the aims and hypotheses to be tested. The student should consult their advisor and/or Chair of the Qualifying Examination Committee for advice on preparation of the brief introductory presentation. The student may use **no more than two** overheads or slides and should provide copies of these to the Qualifying Examination Committee members in advance of the oral examination. Suggestions for the content of these slides may include an outline of their aims or research strategy or important graphs or figures that they may wish to address. **Students are not permitted to use additional slides for clarification.**
- b. Guidelines to assist students in preparing for the oral examination:
  - i. The student should be familiar with the theoretical and factual background relevant to their proposal. All members of the Qualifying Examination Committee are free to ask questions broadly related to the proposal and to areas that constitute the background for the proposal. The student should be able to place the topic of their proposal in the context of the broad field of quantitative biomedical sciences. If the student has been informed by the Qualifying Examination Committee that a revised written proposal still has substantial deficiencies, the student should be prepared to address these during the oral examination.
  - ii. Students should be conversant with the literature in the field(s) covered by their proposal, including those papers that deal with matters of general significance as well as those that relate directly to the proposed research. The Qualifying Examination Committee will expect the student to have an appreciation of the development of ideas (historical perspective) in this field and the potential role of current ideas in guiding the field in the future.
  - iii. Students should be able to consider and generate alternative approaches and should be prepared to interpret hypothetical outcomes proposed by examiners.
  - iv. Students should be thoroughly familiar with the technical aspects of their proposal. They should have a solid understanding of the approaches or techniques they propose to use. They should be aware of the advantages and limitations of these techniques. They should be prepared to defend why they have chosen a particular technique or approach rather than alternative ones that might be available.

- v. The Qualifying Examination Committee may also test the following aspects of the student's background and ability:
- Is the student able to critically evaluate original scientific articles?
  - Has the student designed experiments that address the specific aims and which aims have the potential to add new and useful information to the field of investigation?
- c. The following describes the areas that will be evaluated during the oral examination.
- i. Introduction/Background:
- Background knowledge in area of exam
  - Familiarity with literature
  - Historical perspective
  - General knowledge of the basics of quantitative biomedical sciences, as covered in the core competency courses
  - Ability to evaluate the literature critically
- ii. Specific Aims:
- Are the proposed experiments appropriate to answer the proposed question?
  - Does the student have a theoretical and technical understanding of the approaches proposed?
  - Will the results be interpretable?
  - Will the results add new and useful information to the field of investigation?
- iii. General:
- Can the student answer questions that require the inclusion of new/additional information?
  - Can the student incorporate information into a working model?
  - Can the student propose alternative approaches in cases where the proposed approaches do not provide the information needed?
- d. Final Evaluation of the Qualifying Examination:
- Following the oral examination, Qualifying Examination Committee members evaluate the student's overall performance, considering both the written and oral portions of the examination. The committee should attempt to reach a consensus on the outcome of the exam, but if this is not possible, the three committee members will vote, and the vote of the majority will determine the outcome of the examination. The only possible outcomes for the Qualifying Exam are Pass, Conditional Pass, or Fail. Conditional Passes (passes with conditions to remedy deficiencies) are permitted only after the first attempt at the oral exam. The student will be informed about whether or not they have passed the exam at this time; the Chair of the Qualifying Examination Committee will summarize the strengths

and weaknesses of the oral exam. In cases where the student fails the exam, the Chair will prepare a consensus written summary clearly enumerating the reasons for the failure. If the student passes the oral exam, no detailed written summary of the exam is required. If the student receives a Conditional Pass, the Qualifying Examination Committee may ask them to remedy deficiencies in a written document up to 5 pages or to re-defend a specific topic of their oral exam. In both instances, this must be accomplished **no later than 1 month** after the oral exam. Should the student fail after an attempt to remedy their Conditional Pass, this is considered a “first” failed attempt and the student will be given a chance to redefend in **no later than 1 month**. Following the oral examination, the student and Qualifying Examination Committee Chair should sign the Qualifying Examination Report and the student must submit it, along with their written proposal, to the QBS Curriculum Director. For Conditional Passes, this is signed when they have addressed their deficiencies as recommended by the Qualifying Examination Committee.

e. Repeating the oral Qualifying Examination:

In the event that the student fails the oral examination or their subsequent Conditional Pass, the student will have one opportunity to repeat the oral examination. The second administration of the oral defense must occur **no later than 1 month after the first oral examination**. In the event that the examination is not repeated within the one-month time period, or if a second failure occurs, the student will not be advanced to candidacy for the PhD degree and normally will be unable to remain in the PhD program. However, the situation will be reviewed by the QBS Advisory Committee in which the student and advisor may provide a written statement in regard to extenuating circumstances that may have warranted a fail. Recognizing extenuating circumstances, the Advisory Committee may allow the student to re-do their examination and determine the appropriate timeline in which to do so. Otherwise, if it is determined appropriate upon review by the QBS Advisory Committee in consultation with the Qualifying Examination Committee, the student may opt to leave with a Masters in the program if the appropriate coursework is completed. The final determination for this will be subject to review by the QBS Advisory Committee.

f. After passing the oral Qualifying Examination:

Once a student has passed the Qualifying Examination and advanced to candidacy, the student will continue to be graded on research performance in the laboratory by their advisor at the end of each quarter, on a Credit (CT) or No Credit (NC) scale. If the advisor feels a grade of "NC" is warranted, the advisor must present the details of the student's performance to QBS Leadership and Administration. Grades of "NC" for graduate research received after a student has been promoted to candidacy will be treated the same as

similar grades received for research rotations or course work. A grade of "NC" for research will result in the student being put on probation and may result in dismissal from the program if this causes any of the provisions previously listed (in Section I & II) to be met.

g. Expectations for Dissertation Research Work during Qualifying Exam:

Prior to submission of the topic and specific aims, students are expected to maintain full (i.e. 100%) presence in the lab, teaching, and coursework. It is not acceptable, for example, to be absent from the expected amount of time in lab for weeks or months for the purpose of generating the aims for the Qualifying Examination. Students are encouraged to begin the discussions and background reading needed to select a topic early in their second year of study. Once the topic and aims are approved, students have 4 weeks to prepare and submit the written proposal. Prior to writing their proposal, students are expected to discuss their research schedule with their advisor since it is understood that writing the Qualifying Examination will take a considerable amount of time and effort. During the weeks prior to the oral exam, the expectation for lab presence is reduced. During this time, students should maintain some presence in the lab as communicated with their advisor and must continue to fulfill coursework and teaching obligations. Departures from the timeline for the Qualifying Examination specified here require the prior approval of the QBS Director and Administration,

#### **H. Dissertation and Dissertation Defense**

For the PhD degree, the student shall show competence in original research and shall prepare a doctoral dissertation containing the results of their independent studies. The dissertation should present a coherent investigation of an original scientific research question at a level of rigor suitable for publication in a peer-reviewed academic journal. It should also include a thorough and critical analysis of the published literature in the field and of the methodological and theoretical background of the work.

As students begin preparation for the dissertation defense, they must contact the QBS Administration. This is essential to help ensure that the student and program work together to follow all graduate school policies so that the student will be able to graduate on their projected date. Administration can aid in organizing the time and location of their dissertation defense seminar, private examination, and distribution of public seminar notices if their outside examiner plans to host one. They may also aid in events surrounding their defense such as celebrations or lunches but QBS is not responsible for funding these events. Should the defense need to be remote, additional information regarding this format will be provided by the administration.



Students are advised to visit the Graduate Studies website (<https://graduate.dartmouth.edu/>) for information about dissertation preparation and formatting. Please review forms and guidelines here: (<https://graduate.dartmouth.edu/academics/graduate-school-forms/thesis-and-dissertation-forms> ).

- 1.) Before beginning to prepare the final written dissertation and scheduling a defense date, the student must obtain formal approval from the Dissertation Committee either on their latest signed dissertation progress report or in a separate signed document stating their approval of the timeline to their proposed defense date. This is to be submitted to QBS Administration.
- 2.) After the student has made satisfactory progress in their research post the qualifying exam, the dissertation advisor in conjunction with the student will assemble a Dissertation Exam Committee. The Dissertation Exam Committee will consist of a minimum of three full-time Dartmouth faculty members of which a minimum of two must be from the QBS Program. In the situation where both the advisor and co-advisor are Dartmouth faculty there still must be one additional QBS faculty member. The student must also secure an external member with a faculty-equivalent research appointment outside of Dartmouth. The external member may participate in meetings in person or via videoconference and must be present for the dissertation defense either in person or via video conference. The Dissertation Exam Committee will usually be the student's Dissertation Committee plus the fourth external member. Additional members of the Dissertation Committee that are external to Dartmouth can serve on the Dissertation Exam Committee only with the approval of the Graduate Studies Office. It is imperative that the student informs the Graduate Studies Office in sufficient time to allow for approval of the composition of the Dissertation Exam Committee. The student's advisor and the QBS Director will sign the PhD Examination Committee Approval form :([https://graduate.dartmouth.edu/sites/graduate\\_studies.prod/files/graduate\\_studies/wysiwyg/phd-examination-committee-guarini.pdf](https://graduate.dartmouth.edu/sites/graduate_studies.prod/files/graduate_studies/wysiwyg/phd-examination-committee-guarini.pdf)) and submit this to the QBS Administration along with the expected date of defense.
- 3.) Students must give each member of the Dissertation Exam Committee a copy of the dissertation at least two weeks before the date scheduled for the defense. Final copies of the written and signed dissertation must be submitted to the Graduate Studies office by the dates indicated here ([https://graduate.dartmouth.edu/sites/graduate\\_studies.prod/files/graduate\\_studies/wysiwyg/guarini\\_school\\_thesis\\_guidelines.pdf](https://graduate.dartmouth.edu/sites/graduate_studies.prod/files/graduate_studies/wysiwyg/guarini_school_thesis_guidelines.pdf)) in order to participate in select yearly graduation dates. Therefore, it is recommended that the oral defense be scheduled at a minimum of 2 weeks prior to this date to allow time for the appropriate revisions to be made prior to submission. Students planning to participate in the Investiture Ceremony and Dartmouth June graduation exercises should be aware of the date assigned by the Graduate Studies Office regarding the submission

of the dissertation. Typically, these deadlines occur during the month of May. It is each student's responsibility to meet these deadlines in order to participate in commencement.

- 4.) If any member of the Dissertation Exam Committee finds that the submitted dissertation is inadequate, that member must immediately communicate their concerns to the dissertation advisor and the other members of the Dissertation Exam Committee, which may cancel the dissertation defense as late as 48 hours before the scheduled time of the defense. Concerns from the outside examiner must be communicated up to 72 hours prior to the scheduled defense to allow the committee time to meet the 48-hour deadline.
- 5.) Following a publicly announced and delivered seminar on the dissertation material, the doctoral candidate will defend the dissertation before the Dissertation Exam Committee. The dissertation advisor is responsible for promptly notifying the QBS Administration Office of the outcome of the defense. Should this committee find the dissertation itself or the student's understanding of the dissertation subject area insufficient for the conferral of the PhD degree, the student shall be informed of the deficiencies and the areas that require modification. The dissertation may be revised, and the dissertation defense may be repeated once, and insofar as possible, the composition of the Dissertation Exam Committee shall remain unchanged. The Dissertation Exam Committee will determine an appropriate deadline for the revised dissertation to be submitted. If a student fails to satisfy the concerns of the Dissertation Exam Committee after a second attempt, the student will be immediately separated from the program.
- 6.) The student dissertation can be approved provisionally, pending corrections and minor modifications recommended by the Dissertation Exam Committee. Normally, the student's advisor will monitor these changes and upon satisfactory completion of them, permit the student to submit the finalized dissertation to the Graduate Studies Office.
- 7.) Upon successful completion of the private oral defense, the committee must sign the cover page of the dissertation, printed on Dartmouth Bond Paper available through the QBS Administration offices or otherwise advised for remote situations. It is recommended that the student print at least 5 copies of this cover page to be signed by all members.
- 8.) Students may print their final dissertation on Dartmouth Bond Paper in the QBS Administration Office. Please contact QBS Administration regarding binding and securing additional copies of the dissertation.
- 9.) Finally, a Degree Certification Form, stating that the student has completed all of their program requirements is completed by the graduating student and signed by the QBS Director. This must be submitted to the Graduate Studies Office prior to graduation. This is available through the QBS Administration.

## I. Grading System

QBS core and elective courses are graded as HP (High Pass), P (Pass), or LP (Low Pass). QBS Journal Club, research rotations, supervised teaching, and dissertation research are graded on a CT (Credit), NC (No Credit) scale. All grading should be in accordance with the Guarini School of Graduate and Advanced Studies (<https://graduate.dartmouth.edu/policy/satisfactory-progress>). Grades of "LP" or "NC" in research rotations, journal club, dissertation research, supervised teaching or in core course work have serious consequences, as follows:

One grade of "LP" or "NC" in any quarter in any course results in the student immediately being placed on academic probation. Once placed on probation, any one of the following three conditions will be considered by the QBS Advisory Committee at an assessment hearing should the student not maintain a HP or P in additional coursework:

- a. No action is necessary.
- b. The deficiency must be remedied either by repetition of the course, special examination, or other arrangement.
- c. The student is removed from the QBS program.

The following guidelines will be used for arriving at a recommendation (the term "course" includes the outcome obtained in the Qualifying Examination).

1. If a grade of "NC" is earned in any core course in any subsequent quarter the QBS Administration will recommend option (c).
2. If an additional "LP" is earned in any subsequent course the QBS Administration may recommend options (b) or (c).
3. If more than two "LPs" are earned the QBS Administration may recommend option (c).
4. If a student fails to sufficiently improve his/her performance within one academic year after a performance review recommendation, the QBS Advisory Committee may recommend option (c).

All of the above options will be considered for grades obtained in elective courses at the discretion of the Advisory Committee. Should an assessment hearing be required, the student will be allowed to prepare a statement that may indicate any extenuating circumstances that may have influenced their grades.

## **III. PROCEDURES IN THE CASE OF POTENTIAL SEPARATION FROM THE PROGRAM**

In the event that a student faces potential separation from the program due to course grades, is denied advancement to candidacy due to the failure at two attempts of the Qualifying Examination, or for other reasons, the QBS Advisory Committee will be convened to review the student's overall record and the pending separation prior to final action. The Advisory Committee will meet in conjunction with the student's dissertation advisor, and as deemed appropriate for the situation, the student's Dissertation Committee (if one has been formed), the Qualifying Examination Committee (if the Qualifying Examination has been

attempted), or Dissertation Exam Committee (if a dissertation has been submitted and the dissertation and the dissertation defense attempted). The QBS Director will serve as Chair of the meeting unless the Director is the student's dissertation advisor. In such a case, the Associate Director or a senior member of the QBS Advisory Committee will serve as Chair. Faculty members who feel they might have a conflict of interest that would compromise their ability to make a fair and impartial decision should remove themselves from associated meetings. The Advisory Committee will function as a democratic committee with a single vote for each faculty member present and the final decision will be arrived at by a majority vote.

The overall performance of the student will be reviewed with respect to whether the student is qualified for a productive scientific, or related, career and as to their potential capacity for achieving a PhD level of scientific development within a reasonable timeframe. They will also consider any extenuating circumstances brought to their attention in a prepared document by the student, advisor or other informed party that may have contributed to poor performance in the program. In extraordinary instances, the Advisory Committee may recommend an alternative course of action to that which would normally be stipulated by the QBS rules and regulations for the particular circumstances that prompted the review process. Such a recommendation requires a 2/3 majority vote of the Advisory Committee.

#### **IV. QBS STUDENT GRIEVANCE POLICY**

The process for guiding graduate student progress in QBS, while primarily designed to oversee scientific progress and direction, is also intended to guard against biased treatment of any individual. We have also established a grievance process, consisting of multiple stages, to ensure that student grievances will be investigated fully and fairly, treated confidentially, and resolved in a timely manner. With an effective oversight/grievance committee structure, few grievances or disputes will reach the stage where they require formal resolution from the Guarini Graduate School Offices. However, when resolution is not feasible or successful at the program level, the Guarini Graduate Office is the next place to turn. A grievance may be handled appropriately in the following stages:

1. When possible, speak directly to the person who bears responsibility for the complaint or who is the alleged cause of the complaint.
2. Speak to the research advisor and/or members of the Dissertation Committee.
3. Speak to the QBS Director or Administration.
4. If a satisfactory resolution cannot be reached within the department or program, the aggrieved student may request a meeting with the Dean of Graduate Studies to discuss the issue.
5. If the Dean, working together with the aggrieved student and appropriate faculty member(s), or representatives of the QBS Program is unable to reach a satisfactory resolution, the student can request in writing a formal hearing and ruling by the Dean of Graduate Studies and the Committee on Student Grievances. Please note that allegations of scientific misconduct, violations of the academic honor principle, and certain issues of professional and personal

conduct (sexual harassment, discrimination, and others described in the graduate handbook under code of conduct - non-academic regulations) must be reported to and handled by the Graduate Office. Additional information about Guarini Policies and Procedures can be found here (<https://graduate.dartmouth.edu/policies>).

#### **V. QBS GRADUATE STUDENT REPRESENTATIVES**

Each Year, the QBS Administration will solicit QBS PhD students in good academic standing, have passed their Qualifying Exam, and in their 2<sup>nd</sup> year or above to apply to become QBS PhD Student Representatives. The QBS Advisory Committee will confer on the selection or vote should there be either an abundance of applicants or concerns about applicants. Student Representatives perform as part of the QBS Advisory Committee, act as a liaison between QBS Administration, current students, and incoming PhD & MS students, and hold other responsibilities in the program. These students will have voting rights on non-student specific issues and attend all Advisory Committee meetings unless otherwise directed. They will participate in the admissions process by being assigned MS & PhD Applications to review as well as serve as main participants in the MS and PhD interview processes and events. Student representatives are expected to attend student related academic and social events and to help in the planning of main program events such as the QBS retreat, orientation, and the end of year academic enrichment trip.

#### **VI. ATTENDANCE AND VACATIONS**

The QBS Program follows the established Dartmouth academic calendar with regards to holidays and institutional breaks. Refer to Dartmouth Calendar:

(<https://www.dartmouth.edu/reg/calendar/academic/21-22.html>)

During any year in which they receive compensation from Dartmouth, regardless of the source of those funds, graduate students are committed by the terms of their agreement to be in residence for a period of twelve months commencing one week before Fall Quarter registration. Vacation time should not exceed a total of one month per year, excluding designated holidays, and the time(s) should be mutually agreeable to the student and the dissertation advisor. During the Summer quarters students are expected to perform their dissertation research and enroll in required courses as course availability and time permit. For any expected absences of greater than one month per year and for students who are primary caregivers for a child, rules and regulations adhere to those outlined by Dartmouth Graduate Studies in the Graduate Student Handbook. Medical Leave and Part-time status situations will be reviewed by the QBS Administration and QBS Director in conjunction with the Graduate Studies Office.

Due to the length of time an International Student may spend acquiring their PhD, including the attainment of prior degrees, it is to be expected that most International Students will need to renew their student visa

at some point during their studies. International students are required to report the expiration date of their visa to QBS Administration during their first quarter in the program. Program administration will inform the student's advisor at the time when the visa has only 12-months left before it expires such that the student shall be allowed to visit their home country or take other necessary action to renew their visa if it is their wish to do so. If the student lets their visa expire, then they must give their advisor at least a 12-month window during which a time mutually agreed-upon is to be found for them to renew their visa.

## **VII. INTERNAL QBS MASTERS PROGRAM**

The internal QBS Masters degree option is initially offered to 1.) PhD students at Dartmouth who are enrolled in a program separate from QBS who have permission from their advisor and program and 2.) QBS PhD students in good standing who do not successfully advance to PhD candidacy or wish to leave the program under reviewed circumstances.

Interested students will need to submit to the QBS Director and Administration a signed letter of approval from their advisor indicating they acknowledge the course load and grant permission to pursue the degree. They also need to ensure that approval from their PhD program is communicated to QBS Administration either by their program director or administration. Applications are submitted online through the Dartmouth application system, however students are not required to resubmit transcripts from other institutes or test scores. Students must apply to the MS according to the QBS application cycle deadline.

### **Degree Requirements**

Students applying to the QBS Masters program may begin to fulfill degree requirements prior to being accepted and will also receive credit for any required course that they have received a Pass or higher in. They must notify the QBS Administration, their program, and advisor that they intend to pursue the internal MS should they wish to take more than 3 QBS courses.

The requirements for the internal MS degree, in Quantitative Biomedical Sciences are as follows:

Satisfactory completion of the six core course requirements: Foundations of Epidemiology I & II (QBS 130 & 131), Applied Biostatistics I (QBS 119) or Foundations of Foundations of Biostatistics I (QBS 120) & Foundations of Biostatistics II (QBS 121), Foundations of Bioinformatics I (QBS 146) and a choice of either Foundations of Bioinformatics II (QBS 175), Machine Learning (QBS 108), Advanced Methods in Health Services Research (QBS 139), or Decision and Cost Effective Analysis (QBS 140). One additional approved QBS elective is also required that will not count towards their PhD elective requirements.