



CCNY Biomedical Engineering Ph.D. Program Requirements

To complete the Ph.D. degree in the Biomedical Engineering (BME) program, a student must satisfy the following requirements:

- 1) Satisfactory completion of 48 credits of approved graduate coursework and 12 credits of Dissertation Research. A minimum 3.3 grade point average (GPA) in core BME courses must be achieved before scheduling the First (Qualifying) Examination.
- 2) Satisfactory completion of the First (Qualifying) Examination, which is a presentation of the dissertation research area that highlights key problems in the field.
- 3) Satisfactory completion of the Second Examination, which is a defense of the research proposal.
- 4) Satisfactory completion of the Final Examination, which is a defense of the Ph.D. dissertation.

The detailed expectations for each of these four requirements are outlined below.

BME Ph.D. Course Requirements

Completion of Any Necessary Undergraduate Courses

For entry into the Ph.D. program in Biomedical Engineering, it is suggested that the following undergraduate courses be completed. Prior to commencing graduate coursework, the BME Ph.D. Advisor will prepare a proposed curriculum that may include courses from the list below if any have not been completed; these courses are usually taken before any graduate courses and do not count towards the required 48-credit total.

Courses Normally Taken as an Undergraduate in Biomedical Engineering:
(City College courses satisfying the requirements are given in parentheses)

- 2 semesters of physics (PHYS 20700 & 20800)
- 2 semesters of chemistry (CHEM 10301 & 10401)
- 1 semester of organic chemistry and/or biochemistry (CHEM 21000)
- 1 semester of physiology (BIO 32100)
- 1 semester of cell and molecular biology (BIO 22900) recommended, not required
- 3 semesters of calculus (MATH 20100, 20200, 20300)
- 1 semester of differential equations (MATH 39100)
- 1 semester of linear algebra and vector analysis (MATH 39200)
- 1 semester of thermodynamics (ENGR 23000 or ChE 22900)
- 1 semester of transport phenomena (ChE 34100) or fluid mechanics (ME 35600)
- 1 semester of electrical circuits (BME 20500)
- 1 semester of linear systems analysis (BME 30500)
- 1 semester of engineering mechanics (statics) (ME 24600)
- 1 semester of mechanics or strength of materials (ME 33000)

Transfer of Credits from a Master's Degree Program

Students entering the Ph.D. program with a master's degree may transfer up to 30 credits if the coursework is similar to the courses listed below for the BME Ph.D. program.

To request transfer of credits, fill out a transfer credit form available in the Graduate Dean's office. An official transcript from the master's degree institution must be included, and a description of the courses may be requested. The BME Ph.D. Advisor must approve the transfer of credits and sign the form before

the student returns it to the Graduate Dean's office. The advisor may consult with the graduate committee on which courses can count toward the requirements. The request for transfer of credits should be made before the end of the second semester in the program. After the transfer request is made, students should confirm in their online account that the credits were transferred successfully.

Completion of 48 Credits of Ph.D. Coursework

Once any necessary undergraduate courses are completed, students must complete 48 credits of graduate coursework in four areas, as outlined below. Students who have transferred credits from a master's degree may use equivalent courses taken as part of their master's degree to satisfy the requirements. Students are expected to have completed at least 30 credits after their 5th semester (or after the 2nd semester if they entered the program with an M.S. degree).

(a) Biomedical Engineering Courses (at least 12 credits).

While students are encouraged to take as many BME courses as possible, a minimum of 12 credits of BME courses must be taken. See the BME core course requirements below for the GPA requirement.

BME I2000: Cell and Tissue Engineering
BME I2200: Cell and Tissue Transport
BME I3000: Neural Engineering and Applied Bioelectricity
BME I4200: Organ Transport and Pharmacokinetics
BME I5000: Medical Imaging and Image Processing
BME I5100: Biomedical Signal Processing
BME I7000: Laboratory in Cellular and Molecular Engineering
BME I7100: Cell and Tissue Mechanics
BME I7300: Cell and Tissue-Biomaterial Interactions
BME I7700: Microfluidic Devices in Biotechnology
BME I8000: Bone Physiology and Biomechanics
BME I9000: Skeletal Soft Tissue Physiology and Biomechanics
BME I9300: Scientific Ethics
BME I9500: Entrepreneurship and Financial Economics
BME G6000: Advanced Biomaterials
BME G3200 Neural Systems and Behavior
Any new or once-offered graduate course with the "BME" course code

Students are strongly encouraged to take BME I9300 Scientific Ethics, a 1-credit course. In addition, students have to register for at least 1 credit and up to 3 credits in BME I0000 Biomedical Engineering Seminar, which consists of weekly speakers from the BME field. All Ph.D. students are required to attend the BME seminar for their entire duration of study, regardless whether they are registered for the course.

(b) Biomedical Sciences Courses (at least 6 credits)

BME I4300 Physiology for Engineers, a 6-credit course, is required (see BME core course requirements below). Additional courses in this area include courses in cell and molecular biology (e.g., BIOL V1401 Cell Biology), biophysics (e.g., PHYS V3800 Biophysics), and neuroscience (e.g., BIOL V2301 Neuroscience I). Students should check relevant CCNY and CUNY listings for additional courses.

(c) Mathematics Courses (at least 6 credits)

At least two math-related courses must be taken, from the following partial listing (see the BME core course requirements below for the GPA requirement):

ENGR I1100 Introduction to Engineering Analysis
ENGR I1400 Applied Partial Differential Equations
PHYS V0100 Mathematical Methods in Physics
BIOL V8201 Biostatistics I (6 credits) or alternatively

BIOL 78201 Biostatistics I (6 credits) at the Graduate Center or
BIOL 78001 Mathematical Biology (3 cr.) with BIOL 78002 Lab (2 cr.), at the Graduate Center
ENGR I1500 Introduction to Numerical Methods
ENGR I1700 Finite Element Methods in Engineering
ENGR I4200 Continuum Mechanics

(d) Engineering Courses Other than Biomedical (at least 3 credits)

At least one engineering course in a field other than BME must be completed.

Completion of 12 Credits of Doctoral Dissertation Research

Each student must complete 12 credits of the variable-credit course BME J99xx Doctoral Dissertation Research (xx = number of credits (01-12)). The course is usually taken when a student is finishing coursework and preparing for the Second Exam. To register for the course request permission from the PhD Advisor and then register on CUNYFirst. The course instructor is the PhD Mentor of the student. 1-12 credits of BME J99xx may be taken in one semester. For satisfactory progress, the grade for BME J99xx should be "SP." [Note that if additional credits are needed to maintain full-time status, a "WIU" or Weighted Instructional Unit variable credit course may be taken – see the Graduate Dean's office for details.]

For more detail on when to register for J99xx, WIU or K9000 (dissertation supervision), See the corresponding section below.

BME Core Course Requirements

In order to take the First Examination (the Qualifying Exam), students must obtain a minimum grade point average of 3.3 in five core graduate courses. This GPA requirement is designed to insure that all Ph.D. students have sufficient understanding of the core biomedical engineering fundamentals to pursue advanced study and professional career opportunities.

At least one course must be taken from each of the five groups below:

BME I4300 Physiology for Engineers* (required)

ENGR I1100 Introduction to Engineering Analysis
ENGR I1400 Applied Partial Differential Equations
PHYS V0100 Mathematical Methods in Physics

BME I5000 Medical Imaging and Image Processing
BME I5100 Biomedical Signal Processing

BME I7100 Cell and Tissue Mechanics
BME I2200 Cell and Tissue Transport
BME I8000 Bone Physiology and Biomechanics
BME I9000 Skeletal Soft Tissue Physiology and Biomechanics

BME I7300 Cell and Tissue Biomaterial Interactions
BME I2000 Cell and Tissue Engineering

* Right now this course is taught by Sophie Davis as a two semester course
BME G4301 PHYSIOLOGY FOR ENGINEERS I (Spring)
BME G4302 PHYSIOLOGY FOR ENGINEERS II (Fall)

To calculate the grade point average for the five core courses, BME I4300 Physiology for Engineers, which is a 6-credit course, will be counted as a 3-credit course [thus, to calculate the GPA for the five courses, add up the numerical grade for each course and divide by 5 (where A+ = 4.0, A = 4.0, A- = 3.7, B+ = 3.3, B = 3.0, etc.)]. If a student takes both courses in a group and one grade is higher than the other, the higher grade will be used when calculating the core course GPA. Students who have taken

equivalent courses as part of a master's degree at another institution may use the grades from the equivalent courses. Otherwise the courses must be taken at City College.

Students with a GPA below 3.3 in the five core courses will only be allowed to take the First Examination (the Qualifying Exam) in extraordinary circumstances. Under these conditions, the student should submit a written petition, including a letter from the research mentor, to the Department requesting an exemption from the GPA requirement. Petitions will be considered by the entire faculty and will only be granted if the student can demonstrate extraordinary circumstances (e.g., a major illness during the first year of graduate study). Petitions will be reviewed on a case-by-case basis and should be submitted as soon as possible so that decisions can be made in a timely manner.

First Examination (the Qualifying Exam)

Scheduling of the First Exam:

Once the core course GPA requirement has been met, the student must submit the **First Exam Scheduling Form** (found at the end of this document) to schedule the First Exam. Students who enter the Ph.D. program with a B.S. degree must complete the First Exam before they are one week into their fifth semester in the program (i.e., by the time they have completed two years in the program). Students who enter the Ph.D. program with a master's degree must complete the First Exam before they are one week into their third semester in the program (i.e., by the time they have completed one year in the program). By this time students are expected to have completed 30 credits. Students who would like to schedule their First Exam beyond the stated time must provide a reasonable explanation for the delay when they submit the First Exam Scheduling Form, which still must be submitted within the time period stated above. Not being able to complete the core courses because of scheduling issues should not delay scheduling of the exam. If the First Exam is not passed before the student has completed 45 credits of coursework, permission must be obtained from the Graduate Dean to continue in the program.

Content of the First Exam:

The BME Ph.D. Qualifying Exam is an evaluation of the candidate's potential for Ph.D.-level research. The Exam consists of a written part and an oral part, both of which should present an outline of how the candidate will approach the development of her/his dissertation. The dissertation project need not be defined in detail at this point. Preliminary research results may be presented, but are not required. The presentation may be an overview of the proposed field of dissertation research, identifying a key problem in the field that will become the focus of the dissertation. Or, it may focus on a particular problem, giving enough background literature review that the importance of the problem to the proposed field can be described. This First Exam differs from the Second Exam in that the emphasis is on how the candidate will approach the development of their dissertation; it is not a detailed proposal for dissertation research.

The written part of the First Exam should be reasonably short (about 20 pages, double-spaced) and should include an introduction to the research topic and relevant references. It may include a review and critical survey of pertinent literature, a discussion of physiological and/or clinical relevance, theoretical aspects including mathematical models / computer simulations if relevant, or a discussion of experimental aspects including alternative experimental methods as appropriate. The literature survey is not expected to be exhaustive, but should cover key papers relative to the dissertation topic. It is required that the student prepare this document on his/her own without editorial assistance from the student's research mentor, other faculty and students, or any other person. Consultation with the student's research mentor, other faculty and students, or any other person is permitted, but not on the creation of prose that will appear in the document. Submission of the document is a statement by the student that the student on his/her own created the document, referencing all the sources (printed literature, websites, personnel communications) employed in the formation and preparation of the document. The document will be used by the Examining Committee as a test of the student's ability to communicate clearly and logically in written English as well as a test of his/her capacity to do Ph.D.-level research.

The oral part of the First Exam will involve a presentation of the written document before the Examining Committee and a discussion with the committee of both the document and its presentation. Typically, the student will make a formal presentation of 15-20 minutes duration. This presentation will be used by the Examining Committee to evaluate the student's ability to communicate clearly and logically in spoken English as well as a test of his/her capacity to do Ph.D.-level research. Students are expected to demonstrate an understanding of their general research topic including the physiological and/or clinical relevance and the underlying theory, experimental and mathematical techniques and pertinent literature related to the field. If a student is not familiar with any background topic it should be so indicated and accompanied by a plan to remove the deficiency.

Examining Committee:

The Qualifying Exam committee will consist of three or more members. One of the committee members must be the student's research mentor, and at least two of the members must be members of the BME Department. The student must propose the committee members on the First Exam Scheduling Form. After approval by the BME Ph.D. Advisor, the student is responsible for scheduling the Exam with the committee members within the time period described above. The First Exam written document must be submitted to the committee **AT LEAST one week before** the oral exam. The chairperson of the Examining Committee, who will not be the student's mentor, is responsible for quality monitoring and for properly conducting the exam.

First Exam Results:

The student is informed of the exam result immediately after the exam; the chairperson of the Examining Committee will then give the result to the BME Ph.D. Advisor, who will inform the Graduate Dean; this is the only way the student's record will be properly updated. If a student fails the exam, he/she may petition the Examining Committee to repeat the exam once. After the First Exam is passed, the student moves from Level 1 to Level 2 if 45 credits of coursework have been completed.

Second Examination (Defense of the Research Proposal)

Scheduling of the Second Exam:

It is recommended that the Second Exam be scheduled as early into the student's research project as is feasible (see timeline on page 6); it is usually done after the student has results from preliminary experiments or models and often after a manuscript has been submitted for publication. The student must also provide the Graduate Dean's office with the title of the research proposal, the date, time, and location of the exam, as well as the names and addresses of all the Examining Committee members at least four weeks before the exam. It is also the student's responsibility to sign up for an appropriate room for the Second Exam (usually ST-402 or ST-564). The written research proposal must be submitted to the Examining Committee and the Graduate Dean **AT LEAST two weeks before** the exam. The BME Ph.D. Advisor should also be notified of the exam date so that the presentation date can be circulated to the department.

Content of the Second Exam:

In preparation for the Second Exam the student will develop a proposal that describes the dissertation research. In the Second Exam the student should demonstrate a strong understanding of previous work in her/his field and should present the work she/he has performed to date along with a plan for the research to be completed. The written part of the Exam, the research proposal, has no set format but it is suggested that students use the older format of an NIH grant proposal: Specific Aims - 1 page (required), Background & Significance ~4-5 pages (suggested), Preliminary data -5-6 pages (suggested), Methods and experiments - 10-15 page (suggested), References need to be included but do not count to the 25 page limit, use 11 point Arial or Helvetica, single spaced, 0.5 inch margins. The oral part of the Second

Exam is a public defense of the written research proposal that consists of a seminar-type presentation (approximately 1 hour total time: a 30-40 minute talk with 20-30 minutes for questions). After general questions from the audience, everyone but the Examining Committee (and any additional faculty who choose to stay) leave the room and the student may be asked further questions. Then the student leaves the room while the committee deliberates.

Examining Committee:

At this stage the student's Examining Committee is usually called the Dissertation Committee because the same members usually serve on the Final Exam Committee. The committee usually consists of four or five members, including the student's research mentor. At least three of the members must be from the BME Department and often one member is from outside of CCNY. Note that any students who are being mentored by an outside NYCBE member must have a CCNY co-mentor.

Second Exam Results:

The student is informed immediately after the exam whether she/he passed or not. Suggestions for changes in the scope of work may be given at this time. If a student fails the exam, he/she may petition the Examining Committee to take it again. After passing the Second Exam, the student moves from Level 2 to Level 3 and is considered a Ph.D. **candidate**. The only remaining requirement is the Final Examination, and the student must register for BME K9000 Dissertation Supervision (1 cr.) for every semester until the dissertation defense (the instructor for this course should be the student's Ph.D. mentor or the CCNY co-mentor if the Ph.D. mentor is a NYCBE faculty member).

Second examinations are public events open to the faculty of the School. Doctoral students may attend at the discretion of the Examining Committee chair. Notice of events must be circulated among faculty at least two weeks before the examination date.

Final Examination (Defense of the Dissertation)

Scheduling of the Final Exam:

The defense of the dissertation is scheduled after all the research has been completed and the dissertation is completely written. The student must provide the Graduate Dean's office with the dissertation title, and the date, time, and location of the exam (the student must reserve a room), as well as the names and addresses of all the Examining Committee members at least four weeks before the exam. The dissertation must be submitted to the Examining Committee and Graduate Dean **AT LEAST two weeks before** the exam. The BME Ph.D. Advisor should also be notified of the defense date.

Content of the Final Exam:

The purpose of the Final Exam is to defend the Ph.D. dissertation. The format of the oral defense is similar to that of the Second Exam (see above) except that the focus is on the significance of the research results and the contribution of the student's work to the field. The written dissertation is organized into chapters and usually begins with a comprehensive introductory chapter summarizing the background and significance of the project and ends with a summary/conclusions chapter discussing the overall results and their significance. The middle chapters are usually presented as manuscripts already published, submitted for publication or to be submitted for publication (note that if a paper has already been published copyright permission must be obtained from the journal in which it was published). Students are advised to look at dissertations of recent graduates of the program for the overall format, and contact the Graduate Dean's office for formatting information for the dissertation.

Examining Committee:

The Dissertation Committee is usually the same as the Examining Committee for the Second Exam, although in general there should be at least 4 members from the CCNY engineering faculty plus one

committee member from outside of CCNY. Additional member(s) may be added if desired. The date for the defense has to be communicated to the Dean of Graduate Studies at least 4 weeks before the examination.

Final Exam Results: The student is informed immediately after the defense whether she/he passed or not. Any required changes to the dissertation are noted at this time. The student should submit a copy of the final version of the dissertation (after corrections are made) to all the Examining Committee members.

Depositing the dissertation: When the examining committee the final document has approved the dissertation document must be submitted to with the Dean's office before you can receive your formal diploma. An approval of dissertation with signatures of the committee has to be submitted as well. A template for this page is available from the Office of the Dean for Graduate Studies. You will also receive instructions there on the hardcopy and softcopy formatting and how to deposit the thesis with the librarian. A guideline from the librarian on formating and depositing including deadlines can be found [here](#). Students must also complete a Doctoral Student Exit Survey which they can obtain from the Graduate Dean's office or use [this form](#).

Final examinations are public events open to the faculty of the School. Doctoral students may attend at the discretion of the Examining Committee chair. Notice of events must be circulated among faculty at least two weeks before the examination date.

Please note that the date of the final examination does not constitute the graduation date.

Typical path for Biomedical Engineering Ph.D. students entering with B.S. degree

Academic Milestone	Year 1		Year 2		Year 3		Year 4		Year 5	
	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
To advance level must complete	Level 1 45 course cr. and 1 st exam				Level 2 48 course cr, 2 nd exam				Level 3 12 research cr, defense	
Academic Advisor Selection*										
Coursework (48 credits)										
BME seminar attendance										
First Exam* (Qualifying exam)										
Dissertation Research BME J99xx (12 credits)										
Second Exam (Proposal defense)										
Dissertation Research BME K9000										
Final Exam (Dissertation defense)										

*If not done before entering the program

*Minimum 3.3 grade point average required in five core BME courses before scheduling the First Exam

Typical path for Biomedical Engineering Ph.D. students entering with M.S. degree

Academic Milestone	Year 1		Year 2		Year 3		Year 4			
	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring		
To advance level must complete	Level 1 45 course cr. and 1 st exam				Level 2 48 course cr, 2 nd exam				Level 3 12 research cr, defense	
Academic Advisor Selection*										
Coursework (18 or more credits)*										
BME seminar attendance										
First Exam* (Qualifying exam)										
Dissertation Research BME J99xx (12 credits)										
Second Exam (Proposal defense)										
Dissertation Research BME K9000										
Final Exam (Dissertation defense)										

*If not done before entering the program

*Minimum 3.3 grade point average required in five core BME courses before scheduling the First Exam

Progression through the Program

Change of Levels: A student's progression through the program is identified with Levels 1, 2, and 3:

Level 1: Incoming student taking coursework.

Level 2: Student has completed 45 credits of coursework (not including Dissertation Research) and passed the First Exam.

Level 3: Student has completed all coursework (48 credits + 12 credits of Dissertation Research) and passed the Second Exam. At this stage the student is considered a Ph.D. candidate. Student must register for BME K9900 Dissertation Supervision (1 cr.) every semester until completion of the degree.

For a change of level to go into effect for a particular semester (along with the concomitant reduction of tuition), the requirements for the level change must be completed at the start of the semester (for the actual deadlines consult the Graduate Dean's office). A change of PhD Level is communicated to the registrar using a "Change of Level Request" form, which can be obtained at the Graduate Dean's office or [here](#). Please drop of this form at the Graduate Dean's office.

Obtaining Master's degree on the path to the Ph.D.: See the Graduate Dean's office for details on how to apply for an en-route M.Phil. Degree.

Tuition

Different levels are associated with different tuition payments. It is therefore important to make sure that the graduate advisor is notified as soon as a student has successfully completed first and second exam using a "Change of Level Request" form. The deadline for a change of level to be reflected in reduced tuition payments is generally shortly before or at the beginning of every semester. From and deadline are available from the Graduate Dean's office.

Tuition also differs significantly for in-state and out-of-state students. Out-of-state students are therefore strongly encouraged to communicate their new address to the Registrar as soon as they have moved to NY.

When to register for credits other than course work (J99xx, WIU or K9000)

K9000-- Dissertation Supervision is the course that Ph.D. Students register after moving to Level 3. Level 3 means that the student has passed the First and Second Exams and has completed 48 credits of course work and 12 credits of Dissertation Research (J99XX). Once a student is Level 3, K9000 is the only course they can register for. **Only Level 3 students should be registered for K9000, Dissertation Supervision and the course is always for 1 credit.**

WIU stands for Weighted Instructional Unit. **This is not a course.** WIUs are used in registration to account for student activities (i.e., teaching, research, etc.) that would allow the student to be classified full-time (9 or more credits) in situations when they cannot or do not have to be registered for a full course load.

Ph.D. Students at Level 2 and Level 3 must always be in full-time status. Foreign students must always be in full-time status regardless of their level. Students on a Fellowship are expected to be in full-time status as well. Level 1 Ph.D. students who are self-supported are basically the only Ph.D. Students that may be on part-time status. WIUs are used as needed to have students classified full-time on a given semester.

Because the City College Student Information System cannot automatically classify Level 2 and 3 students as full-time WIUs are used, in addition to the required course work, to classify the students full-time. Students who have to register WIUs register for as many units as they need to be full-time. Last semester, we began to automatically add WIUs to the registration of Level 3 students to ensure their

classification as full-time students. For other students the number of WIUs to be used has to be determined on an individual basis.

Examples:

A student has enough remaining courses to take a full load, but the mentor asks them to carry a lower course load so they can concentrate on some aspect of research then they would add enough WIUs to their course load to be classified full-time.

A student only needs one more course to complete the course requirements he would register the course and 6 WIUs to make the 9 credits that are required to be classified full-time.

A student has completed all 48 credits of course work and 12 credits of Dissertation Research but has not taken the Second Exam, that student has no other courses to register. Since the student must be in full-time status he/she would register for 9 credits WIUs and continue to do so until he passes the Second Exam and moves to Level 3.

How to register:

Students register these courses directly using their CUNYFirst account. WIU credits are to be registered under the name of the PhD Advisor (the single advisor for the BME program). The instructor for the J99xx and K9000 credits is your specific PhD Mentor (each student has her/his own mentor). So please be sure you select the correct course/section when registering. Note that prior to registration for any of these credits the student may need to be given permission to register for those credits. Please email the PhD Advisor (not your thesis mentor) to let him/her know which credits you would like to register for. He/she can then give you permission to register for those courses on CUNYFirst (they will then show up as a course you can register for). Be sure to submit such requests per email to bmephd@ccny.cuny.edu if you want them to be addressed in a timely manner.

For Further Information

For rules, regulations, and policies related to CCNY doctoral students in the Grove School of Engineering, please see the [CCNY Graduate Bulletin](#) before contacting one of the advisors below.

Department of Biomedical Engineering

BME Ph.D. Advisor:

Prof. Lucas Parra, Steinman Hall Room 402, 212.650.7211, bmephd@ccny.cuny.edu (be sure to use this email address, and not parra@ccny.cuny.edu)

Administrator for Graduate Studies (assists the BME and ChE graduate programs):

Ms. Maria Velazquez, Steinman Hall Room 314a, 212.650.6671, mvelazquez@che.ccny.cuny.edu

Grove School of Engineering

Dean of Graduate Studies:

Dean Ardie Walser, Steinman Hall Room 152, 212.650.8030, walser@ccny.cuny.edu

Assistant to the Dean of Graduate Studies:

Ms. Belkys Bodre, Steinman Hall Room 152, 212.650.8030, bodre@engr.ccny.cuny.edu



First Exam Scheduling Form PhD Program in Biomedical Engineering

Name: _____ Date this form submitted: _____

Date you entered the PhD program (semester, year): _____

Highest degree when you entered: _____

Core Course GPA requirement:

Please list your grades for the following core courses:

BME I4300 Physiology for Engineers (required) Grade: _____

ENGR I1100 Introduction to Engineering Analysis Grade: _____

ENGR I1400 Applied Partial Differential Equations Grade: _____

PHYS V0100 Mathematical Methods in Physics Grade: _____

BME I5000 Medical Imaging and Image Processing Grade: _____

BME I5100 Biomedical Signal Processing Grade: _____

BME I7100 Cell and Tissue Mechanics Grade: _____

BME I2200 Cell and Tissue Transport Grade: _____

BME I7300 Cell and Tissue Biomaterial Interactions Grade: _____

BME I2000 Cell and Tissue Engineering Grade: _____

Overall GPA for core courses (see BME PhD Program Requirements for guidance on doing the calculation): _____

Note that the core course GPA must be at least 3.3 before you schedule the First Exam. If you are attempting to schedule your First Exam before the core courses have been completed, please explain why you are trying to do this:

If it has been more than two years since you began the PhD program if you entered with a BS degree, or more than one year if you entered with a MS degree, please explain why you need more time to schedule the First Exam:

Proposed First Exam Committee Members (must be at least three members, and must include your research advisor):

Proposed Title of First Exam:

Proposed Date of First Exam: _____ [You must reserve a room.]

Signature of PhD Advisor: _____ **Date:** _____