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UNIVERSITY OF PITTSBURGH

SWANSON SCHOOL OF ENGINEERING

DEPARTMENT OF BIOENGINEERING

HANDBOOK

for

Graduate Students

PITT | SWANSON ENGINEERING

BIOENGINEERING

Prepared by

The Associate Chair of Graduate Education

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The Bioengineering Graduate Committee
which currently consists of the following members:

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Ipsita Banerjee, PhD (MCSE Track)
Bryan Brown, PhD (TERM Track)
Tracy Cui, PhD (Neural Engineering Track)
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Effective Date

The policies and regulations put forth in this handbook are effective as of the date given in the upper right corner of the cover page (next to the word "Version"). It is the student's responsibility to ensure that they are using the most recent version (which will be posted on the Department of Bioengineering website). When policies are changed in the middle of a student's program, students usually have the option of following the new or old guidelines related to any requirements that they have already been completed (i.e., are "grandfathered" into the old requirements). Students should contact the Graduate Administrator or Graduate Program Director with questions on how any curricular changes affect their program progress.

Disclaimer

The information contained herein is provided for your reference. The current version of the handbook is a beta version, which is expected to be incomplete and may contain certain information that is outdated and/or inaccurate. In this version, guidance from the Graduate Program Director or from the website take precedence over this document. We are seeking feedback to improve the version for a full release. Please be advised that University, School, and Department policies and requirements are subject to periodic changes. The Department of Bioengineering reserves the right to correct and/or amend the information without advance notice. For additional information about graduate study at the University of Pittsburgh, Department of Bioengineering, please contact the Graduate Program Director. This document will use the term Graduate Program Director to refer to the position of Associate Chair of Graduate Education. This document will use the term Graduate Administrator to refer to the position of Assistant Director of Graduate Programs.

It is recommended that students also check the Swanson School of Engineering Graduate & Professional Studies Catalog (note: students need to select "Graduate Catalog" from the drop down menu to access graduate policies) and the Regulations Governing Graduate Study at the University of Pittsburgh when using this handbook for researching and resolving issues. When searching or browsing the graduate catalog, it is important that you are considering the correct academic year and program.

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PURPOSE

This handbook is a resource that contains the policies relevant to bioengineering graduate students and the bioengineering graduate program. The purpose of this handbook is to define current regulations as well as "best practices" to achieve the following goals:

- Supplement faculty mentoring of graduate students to promote clear understanding of responsibilities and expectations of graduate students.
- Outline graduation requirements and provide milestones and typical timelines to assist graduate students in timely completion of their MS and PhD degrees.

- To direct students to the proper resources and sources of information for other questions and to become a comprehensive guide for all questions on programmatic issues regarding the graduate programs.

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If you notice incorrect or important missing information, please provide feedback.

PROLOGUE: INTRODUCTION AND BACKGROUND

The Department of Bioengineering graduate program at the University of Pittsburgh (Pitt) has the goals of educating professionals who advance bioengineering goals and to create new knowledge through research. A strength of the department is its interdisciplinary activities with faculty outside of bioengineering. These include but are not limited to faculty from the Schools of Medicine, Health and Rehabilitative Sciences, Dental Medicine, The Graduate School of Public Health, the clinical faculty at the University of Pittsburgh Medical Center (UPMC) hospitals, and other departments within the Swanson School of Engineering (SSoE). Its mission is broadly defined to incorporate the application of engineering principles, methods, and technology in two broad areas:

- Scientific inquiries into fundamental biological phenomena
- Development of instrumentation, materials, devices, and systems relative to application in the biological sciences and medicine

Thus, the bioengineering faculty is applying various forms of engineering principles, technology, and methodology to a broad variety of medical and life sciences problems. Please visit our website to learn more about our areas of innovative research, laboratories and centers.

Our graduate degree-conferring programs (detailed in Chapters 5 and 6) are:

- Master of Science (MS) Programs (both non-thesis/ “Professional” and Thesis options available)
  - Dual MBA- MS Option
  - MS- Medical Product Engineering (MS-MPE)
  - MS- focused curriculum in Neural Engineering (MS-NE)
  - MS- Thesis Option
- Doctor of Philosophy (PhD)
- Medical Doctor/PhD
- Doctoral in Physical Therapy/PhD
- Certificate in Medical ProductInnovation

The Department of Bioengineering follows the policies set forth by the Swanson School of Engineering, and the policies SSoE follows are stricter than the policies set by the University, via the University’s Graduate Policies and the School’s Graduate Catalog.

To ensure timely and unambiguous responses, all communications between the Graduate Committee and individual students, faculty or faculty advisors will be handled by the Associate Chair of Graduate Education.

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If you notice incorrect or important missing information, please provide feedback.

0. UPDATES FOR THIS RELEASE

1. Updates to BIOENG 3999 requirements to reflect new policy
2. Updates to the graduation checklist and ETD submission requirements to reflect new procedures.
3. Updates to the professional MS programs.
4. Links added to Section 9 related to mental health.
5. Updated links and removed links to websites that no longer exist.

1. ADMISSIONS REQUIREMENTS AND EXPECTATIONS OF PRIOR EDUCATION

1.1. Full Graduate Status

Only students with full graduate status or undergraduates who are enrolled in Engineering Accelerated Graduate (EAGr) Program may be considered for the award of an advanced degree. With the exception of students in the EAGr program, students must be a graduate of a recognized college or university and must be considered qualified for advanced study by the department or school. This normally is demonstrated by a B average (a quality point average of 3.0 on a 4.0 scale) or better in the total undergraduate program. If students with less than a B average present alternative evidence (such as completion of an advanced degree or successful relevant work experience) of superior ability, they may be considered for full graduate status on the recommendation of the Department of Bioengineering. These decisions are made on a case-by-case basis. Students who are entering with full graduate status must have an undergraduate degree in engineering, mathematics, statistics, or one of the natural sciences. It is assumed that each student enrolling in the graduate program has a baseline background in bioengineering or biomedical engineering. In other words, an undergraduate knowledge is necessary in both engineering and biology principles. Students with degrees in other disciplines outside of those previously mentioned are considered on a case-by-case basis.

1.2. Provisional Graduate Status

Students who are graduates of a recognized college or university but who do not qualify for full graduate status because of deficiencies in either their undergraduate course program or their scholastic achievement may be considered for provisional graduate status if strong supporting evidence of their ability to complete a graduate program is provided. Undergraduate courses taken to remove deficiencies do not contribute toward completion of graduate degree requirements. While each case is different, provisionally admitted students may be required to take math, engineering, or biological courses relevant to their anticipated track and obtain grades of a B or better. Transfer from provisional to full graduate status is initiated and recommended by the Department and is possible only after removal of deficiencies and other conditions noted at the time of admission and satisfactory progress in graduate work. Students will receive notification from the Department shortly after the term in which they have completed the requirements to be removed from Provisional status.

1.3. Undergraduate Courses

Undergraduate courses may be taken as remedial courses and are sometimes recommended as part of a provisional admission, but these and any other undergraduate courses may not be counted toward any graduate degree requirements, per SSoE policy.

If you notice incorrect or important missing information, please provide feedback.

1.4. Special Student Status

A student not currently enrolled at the University of Pittsburgh will be granted temporary admission typically only for one term and for at most for a total of six credits. Students in this classification cannot earn credits toward the completion of degree requirements at the University of Pittsburgh with the following exception: Students who are unable to meet the deadline for filing an official application for admission may be granted temporary admission status by the appropriate Graduate Program Director. Regular admission must be granted within the first term of registration as a Special Student. In the case of Special Student status, graduate credits earned during temporary admission period can be applied toward the degree with approval from the Graduate Program Director.

Please note that students applying for Special Student status should contact the Graduate Administrator to obtain the proper form for processing with SSoE administration. For more information on Special Student Status, please see "Graduate Special Student" on this page.

Interested applicants and others who do not prefer to become full-time students might opt for Special Student status in other extenuating circumstances, including cases in which a student may not have the proper background in engineering.

1.5. Application Deadlines and Decisions

The application deadline for full admission to the PhD and Research MS graduate programs (for consideration of funded positions) is December 1st (Fall semester). *Early applications (prior to December 1st) are strongly recommended* as graduate student researcher position funding (in the case of PhD students and sometimes research MS students) are awarded on a competitive and time-sensitive basis. Late applications, including for the Spring semester, are accepted but receive lower priority for this funding or financial assistance. They are considered on a case-by-case basis. The admission process varies across graduate degree programs. For the PhD program and MS thesis program, admissions are largely based on a prospective student and a faculty member identifying a mutually acceptable match. Therefore, it is recommended to contact faculty of interest before and during your application process.

Application deadlines for the Professional MS programs are June 15 (domestic applicants) and April 1 (international applicants) for Fall semester, and November 1 (domestic applicants) and October 15 (international applicants) for the Spring semester. Meeting the application deadline affects scholarships, which are awarded on a competitive and time-sensitive basis. A Graduate Admissions Committee consisting of the Graduate Program Director and several other faculty members makes all application decisions for the Professional MS degree programs.

1.6. English Proficiency and Teaching Assistant Certification

Graduate students need to have a strong command of the English language to participate in lectures and class discussions. English proficiency can be demonstrated. If the test identifies a need for remedial English courses, the department usually encourages the student to follow those recommendations. For non-native English speakers appointed as teaching assistants or teaching fellows, there is a separate English language comprehension test upon arrival (information on this exam will be provided via email, usually in July). Those who do not perform satisfactorily on the test are assigned non-teaching roles and must complete special coursework in English until they achieve passing scores. For these students, an unsatisfactory score during reappointment can lead to non-renewal of the assistantship. Since all PhD students are required to serve as teaching assistants for at least two terms, international students pursuing a doctoral degree must take this test. Additional information on English proficiency guidelines can be found under 'Admissions Procedures' at this link.

2. TUITION AND FUNDING INFORMATION

2.1. Tuition and Fees

Tuition rates, fees, and other charges paid by graduate students are established by the Board of Trustees in cooperation with the University Administration. If a student receives a stipend as a graduate student researcher or receives a tuition scholarship, the student must still pay the activity fee on their own each term.

Current information on tuition and fees may be found by visiting the appropriate University of Pittsburgh tuition website.

2.2. Financial Assistance

Admission to the graduate program does not guarantee the granting of financial aid. Students are often supported on training grants, individual fellowships, research grants from their advisors, foundations, and other sources. Per University policy, all financially supported graduate students will receive a contract letter for each academic year.

More information on Financial Aid can be found under Financial Aid in the School Catalog and within the Office of Admissions and Financial Aid.

2.3. Funding of Graduate Students

Graduate students receiving stipends and their research advisors are required to have a yearly contract outlining stipend, contract term, mutual responsibilities, and expectations. The contract is to be reviewed by the graduate student and their advisor every semester or academic year depending on the length of the contract. A student's funding may be discontinued if the research advisor is not satisfied with their performance. The department has a longstanding tradition of funding every full-time PhD student in good standing through some mechanism (their advisor's available funds, fellowships, training grants). In cases where funding is no longer available through these mechanisms, the

department typically funds students as a last resort until the student attains another source of support or they graduate. Ideally, the student's research advisor should contact the Graduate Program Director if an interruption in funding is anticipated. However, the student can also contact the Graduate Program Director if they anticipate an interruption to their funding and suspect that their advisor has not taken any action. In these cases, the department may implement certain conditions of the funding (switching to a new advisor with funding or accelerating the completion timeline of their dissertation). The Graduate Program Director works with a student's advisor to determine the support mechanism prior to the end of the contract period. MS students can also be supported by several mechanisms (their advisor's available funds, fellowships, etc.) but the department does not generally fund these students.

Contact the Graduate Administrator for directions on how to apply for internal fellowships.

3. GENERAL SCHOOL AND UNIVERSITY POLICIES

Additional Swanson School of Engineering Policies can be found on the SSoE Catalog, at the site here. It is important that your search correctly reflects the academic year and graduate program.

The University of Pittsburgh Graduate Policies section also has additional information.

3.1. Course Registration

First semester course registration has a slightly different process than registration in other semesters. A couple of months preceding a student's first semester, the Graduate Program Director has a virtual meeting with students entering each track to discuss common courses to be taken during their first semester. The track coordinator(s) often join the meeting. Students are also advised to discuss their coursework plan with their advisor. They should discuss their full course plan to ensure that they will have the appropriate academic background for their proposed research and intended career. Students pursuing two degrees, or a degree and a certificate simultaneously, should meet with advisors in both the primary and secondary academic programs. Students will complete an enrollment form (digital form), sign the form, and request their advisor's signature. The form is then sent to the Graduate Administrator who will either register the student for their courses or send the students instructions on how to self-enroll in the desired courses. In subsequent terms, a student will enroll themselves using Pitt's online enrollment system. It is the student's responsibility to be aware of course registration deadlines so that timely registration can occur and so that late fees will not be assessed.

After the first year in the program, an administrative hold is placed on each student's account. The hold is released and the student is able to register, once annual requirements from the department are met. Starting from the end of Year 1, PhD and Research MS students are required to submit a completed and signed Graduate Student Progress Form (previously known as the Graduate Student Evaluation), which will continue on an annual basis. This is distributed via a survey. This form requires students

to review their progress over the preceding year, comment on their working relationship with their advisor, and propose goals for the upcoming year. The student and advisor discuss the content, and the advisor signs it before it is submitted to the graduate administrator. After a PhD student forms their dissertation committee (usually near the end of the 2nd year or during the 3rd year), they are also required to have an annual meeting with their dissertation committee and submit the "Graduate Student Annual Dissertation Committee Meeting Update Form" to remove the hold. See Section 7.2 for more details on committee formation and form submission requirements.

The Office of the Provost publishes the University of Pittsburgh Academic Calendar, which establishes the dates for registration seen here. These dates also appear in the Schedule of Classes for each term, as produced by the Registrar's Office. After the start of classes, registration is permitted only with the written approval of the Dean in unusual circumstances and with the payment of a late registration fee.

Students may use the "Pitt Class Search," a comprehensive listing of all courses offered at the University during a particular term, in PeopleSoft to determine which courses to register for outside of the Department of Bioengineering. This can be accessed through the PeopleSoft Student Information System (accessed via my.pitt.edu). Instructions for enrollment can be found here.

The Registrar will withhold registration and add/drop services from students who so warrant for financial, academic, or disciplinary reasons. The University reserves the right to change registration procedures.

3.2. Cross-Registration

Carlow University, Carnegie-Mellon University, Chatham University, Duquesne University, La Roche College, the Pittsburgh Theological Seminary, Point Park University, Robert Morris University, and University of Pittsburgh are part of the Pittsburgh Council on Higher Education (PCHE). The PCHE offer students the opportunity for cross-registration in graduate programs in the fall and spring terms. Credits earned by cross-registration in graduate courses at these institutions, when approved in advance by the student's graduate advisor, are accepted as University of Pittsburgh credits for the purpose of the calculation of the quality point average and the completion of degree requirements. Each department at each institution retains the authority to establish the prerequisites for admission and the maximum enrollment in its own courses and to grant priority in registration to its own graduate students. Students cross-registering should also consult the academic calendar for the host institution, which may differ from the University of Pittsburgh academic calendar. It is important to note that students must be registered for at least 9 credits of graduate courses in a given term at Pitt for Cross-Registration to occur. Students may find the form to cross-register here.Students are only required to have the form signed by themselves and their advisor. Once completed and signed, students submit the form to ssoeadministration@pitt.edu who will acquire the "Home Dean Approval" signature and forward the form to our registrar, who will finish the cross-registration process. Students are highly encouraged to consider cross-registration

opportunities. Students should be aware that deadlines for cross-registration may precede University of Pittsburgh add/drop deadlines and should initiate the process as soon as possible. Students may not register for a PCHE course in their graduating semester.

3.3. Course Withdrawal

Students may add or drop courses before the end of the add/drop period. A student who wishes to withdraw from an individual course after the add/drop period but prior to the monitored withdrawal deadline (typically the end of the ninth week of the fall/spring term) or as noted in the academic calendar for the summer sessions, must complete a Monitored Withdrawal Form (contact the department administrator for a copy of this form), and return the completed form to the Graduate Administrator for processing with the SSoE Office of Administration. A "W" grade will then be issued. After the official withdrawal deadline, a student may withdraw from a course only in extraordinary circumstances and with the permission of the Associate Dean for Academic Affairs. Students should first contact the Graduate Administrator for assistance with processing this request. A similar policy pertains to switching from credit to audit.

3.4. Student Resignation and Readmission

Students may terminate their registration in all classes by informing the Office of the Registrar of their intent to do so prior to the end of the add/drop period for the term. Students registered for courses scheduled to begin after the end of the add/drop period for the term may terminate their registration by informing the Registrar's office of their intent to do so at any time prior to the first scheduled meeting day of the class. Students are encouraged to view the University's resignation webpage for more information.

An official resignation occurs when the student notifies the Office of Student Accounts of the intent to terminate registration for all classes after the end of the term's/session's add/drop period but no later than the monitored withdrawal deadlines noted in the academic calendar. The R (resign) grade will be assigned for each course for which the student registered.

A student who stops attending a course and does not initiate the withdrawal or resignation procedures will receive no credit for all assignments that are missed and will be assigned a grade accordingly (typically an F grade).

Students who plan to return to the University within one calendar year must indicate this when they provide notification of resignation. Students who do not advise the University of their intent to return to the University within one calendar year are classified as permanent resignations. Students who permanently resign and later decide to return to the University must apply for readmission and proceed through the admissions process. This includes cases when the readmission date is less than one year from the effective date of resignation.

If you notice incorrect or important missing information, please provide feedback.

3.5. University Grading Policy

Introductory (or master's level) graduate courses are assigned the numbers 2000-2999; advanced (or doctoral level) graduate courses are assigned the numbers 3000-3999. Both sets of courses are acceptable for completing graduate degrees within the department.

The following policy includes all grades and their corresponding definitions that may be legitimately issued within the schools of the University of Pittsburgh. All available grading options and their uses are also included. Each school uses symbols and grading options consistent with this University grading policy. The Registrar will record for a particular course only those grades specified in the Schedule of Classes. Additional information can be found on the SSoE Graduate Catalog here.

Grading System Definitions and Quality Points

A+	=	4.00
A	=	4.00 Superior attainment
A-	=	3.75
B+	=	3.25
B	=	3.00 Adequate graduate-level attainment
B-	=	2.75
C+	=	2.25
C	=	2.00 Minimum graduate-level attainment
C-	=	1.75
D+	=	1.25
D	=	1.00
D-	=	0.75
F	=	0.00 Failure
G	=	Course work unfinished because of extenuating personal circumstances
H	=	Exceptional (honors) completion of course requirements
I	=	Incomplete course work, due to the nature of the course, clinical work,or incomplete research work in individual guidance courses or seminars
N	=	Noncredit audit
NC	=	No Credit
R	=	Student resigned from theUniversity
S	=	Satisfactory (successful) completion of course requirements
U	=	Unsatisfactory (failing) completionof course requirements
W	=	Withdrawal
Z	=	Invalid grade reported

** No grade reported

Grading Options

LG	Letter Grade
H/S/U	Honors/Satisfactory/Unsatisfactory
H/HS/S/LS/U	Honors/High Satisfactory/Satisfactory/Low/ Satisfactory/Unsatisfactory*

S/NC	Satisfactory/No Credit (formerly the S/N option)
LG and H/S/U	Letter Grade and Honors/Satisfactory/Unsatisfactory
LG and S/NC	Letter Grade and Satisfactory/No Credit

*This option is available for professional students in the School of Medicine only.

G and I Grades (Incomplete Work)

Coursework with a G or I grade will not count towards graduation requirements. However, a student may graduate without removing G and/or I grades from the record provided all degree requirements have been met based on completed courses and after department approval of graduation. G or I grades are initiated by the instructor of a course. Therefore, students should direct inquiries about these grades to the course instructor(s).

The G grade signifies unfinished course work due to extenuating personal circumstances. Students assigned G grades are required to complete course requirements no later than one year after the term in which the course was taken. After the deadline has passed, the G grade will remain on the record, and the student will be required to reregister for the course if it is needed to fulfill requirements for graduation.

The I grade signifies incomplete course work due to nature of the course, clinical work, or incomplete research work in individual guidance courses or seminars. Prior to 2022, BIOENG 2999, 3997 and 3999 grades were assigned I grades, which converted to S grades after the student successfully completed their thesis defense, dissertation proposal, or dissertation defense, respectively. Since this policy was changed, most recent grades for these courses should contain an S/NC grade though some older grades may still contain I grades. If a student has an I grade that needs to be converted, they should contact the listed instructor in PeopleSoft (typically their advisor) who is responsible for changing these grades.

Any I or missing grades on a student's transcript should be converted to an S/NC or letter grade ideally before they propose, but absolutely before they defend.

3.6. Probation and Repeating Courses

An average of at least B (cumulative GPA=3.00) is required in the courses that make up the program for any graduate degree and must be maintained throughout the duration of the program. A student with full graduate status is automatically placed on probation whenever their cumulative GPA falls below 3.00. The student will be informed of their status on probation on a semester-by-semester basis with updates from the Graduate Administrator and will have two terms to provide evidence (that their cumulative GPA has risen above 3.00) to be taken off of probation. If a student does not raise their GPA to above a 3.0 after two terms, they may be subject to removal from the program per SSOE policy. Students who are on probation will not be eligible to take the preliminary exam or to complete their proposal or defense in either the PhD or Master's programs. Students will receive a letter detailing the terms of academic probation and how they can be removed from probation status after each term. GPA is calculated by dividing the total number of letter grade credits taken in the graduate program into the total number of

grade points earned in the graduate program. Only letter grades with GPA values will be used in computing the Grade Point Average.

A student must receive a minimum grade of a C for a course to count towards the PhD graduation requirements (detailed in Chapter 6). Courses with a grade below a C will count toward a student's GPA unless the student repeats (i.e., retakes) the course. A student must receive a minimum grade of a B to meet curricular conditions of a conditional pass outcome of a preliminary exam (details of a conditional pass outcome for the preliminary exam are in Section 7.1).

Any request to repeat courses must be approved by the Graduate Program Director during the course registration process for each term.

A student may repeat any course in which a grade of B- or lower is received if an authorization to repeat the course is given by the student's advisor. The course must be taken the next time it is offered or within a year, whichever occurs first. The grade earned by repeating a course is used in lieu of the grade originally earned, although the original grade remains on the transcript. No course may be taken more than two times, total. No sequence course may be repeated for credit after a more advanced course in that sequence has been passed with a B or higher grade. No course may be repeated at any other institution and have that grade accepted as a replacement for the original grade earned at the University of Pittsburgh. The repeated course must be the same as that in which the original grade was earned. Grades of W, R, or N reported for the repeated course will not be counted as a course repeat. To initiate only the last course grade being computed in the GPA, a Course Repeat Form must be obtained by and submitted to the Graduate Administrator for processing with the SSoE Office of Administration and the Dean's Office.

3.7. One- and Two-Credit Courses

One- and two-credit courses may count toward the course requirements, but students should understand that such courses may leave them without enough completed credits for certain graduation requirements that are based on 3-credit courses. Approval by the Graduate Committee is required for a lesser number of credits to meet a given course requirement (e.g., 2 credits for a 3-credit requirement, or 8 total credits for a 9-credit requirement). Consideration will be given to the appropriateness of the course for the requirement and the student's educational and career goals. Any shortfall of credits will need to be made up by credits elsewhere so that the total number of credits necessary for the target degree are still attained.

3.8. Transfer Credits

Students may transfer credits of graduate coursework taken at a recognized institution used to fulfill requirements for another graduate degree (further details are here). Students with a prior Master's degree may transfer a maximum of 30 credits toward the PhD degree. Students who have taken graduate courses that were not used to satisfy

undergraduate or a Master's degree requirement may apply up to 6 of those credits toward the MS or PhD degree. If the previous MS degree was not in Bioengineering, it is likely that the student will not be able to transfer the full 30 credits. All transferred coursework must be relevant to Bioengineering and complement the student's program of study at the University of Pittsburgh. It is not permitted to transfer any undergraduate credits for graduate requirements. The total credits necessary as well as the specific course requirements will remain unchanged, regardless of course transfer status (i.e., students entering the PhD program with a MS degree have the same requirements as students entering with a BS degree except MS students can transfer courses from their prior graduate degree to meet some degree requirements). Students who wish to transfer credits must complete a Credit Transfer Form, list these previously taken courses in the appropriate categories of the Course Requirements Form, and submit them via the Canvas page to the Graduate Program Director along with all supporting documentation (transcripts, course descriptions, syllabi, etc.). Note that the student must obtain approval from the appropriate track coordinator if a transfer course is to take the place of a track course. Online courses are allowed to be transferred from prior institutions with approval by the department and the dean. If students have questions about their eligibility for transfer credits, they should contact the graduate administrator.

For the course credits to transfer, the student must have obtained at least a B grade in these classes. Students should note that only the credits transfer. Grades earned at previous institution(s) do not transfer and therefore do not contribute to the GPA earned as a graduate student at Pitt.

3.9. Plan of Study and Tracks in the Graduate Programs

The student and their advisor are responsible for the appropriate selection of courses and program of study (See Section 3.1). The department recognizes that this proposed plan may change over time, and the student is therefore not obligated to follow it exactly, have the plan approved, nor request permission to modify the plan.

The MS Research and PhD programs require students to select a track and take specialized courses in that track. Each student in one of these programs, under guidance and agreement with their advisor, are to select one of the programmatic tracks:

- Biomechanics
- Molecular, Cellular, and Systems Engineering
- Bioimaging & Signals
- Neural Engineering
- Medical Product Engineering, PhD and Research MS
- Tissue Engineering and Regenerative Medicine

Students in the Professional MS program generally follow the curricula outlined for the medical product engineering degree or the neural engineering focus. Some exceptions are made to pursue other course trajectories.

If you notice incorrect or important missing information, please provide feedback.

3.10. Bioengineering Seminars

The Bioengineering Seminar Series (BIOENG 2023) is held every Thursday afternoon during the Fall and Spring Terms at 4:00 pm and attendance is mandatory when enrolled in the seminar course. The seminar course is one credit for each semester in which the student is enrolled.

PhD, MD-PhD, and DPT-PhD students are required to complete six credits of seminar. At least four credits must be through BIOENG 2023, and two of the seminars are permitted to be outside of the Bioengineering seminar. Approved seminars offered in other departments are available here. A 1-credit exception to the BIOENG 2023 requirement is available for students who choose to take a teaching in STEM preparation course (see details in Section 3.11).

Research MS students are required to complete three credits of seminar. Students seeking a 0-credit option for seminar should contact the Graduate Administrator. A 1-credit exception to the seminar requirement is available for students who choose to take a teaching in STEM preparation course (see details in Section 3.11).

Professional MS and part-time graduate students are required to enroll in the non-credit seminar course (BIOENG 2024) and maintain a passing grade via sufficient attendance. Students in these programs should consult with their advisor regarding the seminar that they should attend to meet this requirement.

3.11. Teaching Practicum Requirements

Research MS Students: Required to complete one semester of Teaching Practicum.
PhD Students: Required to complete two semesters of Teaching Practicum.
Professional MS Students: Not obligated to fulfill any Teaching Practicum requirement.

Process

- Administration Oversight: The department manages the fulfillment of the Teaching Practicum requirement without requiring specific class enrollment (i.e., students do not register their teaching practicum on Peoplesoft).*
- Initial Steps: Eligible students should acquire a TA Assignments Form from the Graduate Administrator during their first semester in the program followed by a meeting with the Assistant Chair of Graduate Student Professional Development to discuss their responses, backgrounds, and experiences. This aids in assigning suitable classes for the Teaching Practicum.
- Assignment: Assignments are typically made about a month before classes commence (early December for the spring semester, mid-July for the fall semester). Assignments are usually designated for 2nd or 3rd-year students. In some cases, an assignment may occur during the first year.

* The department previously had a teaching practicum course requirement so some students may have received credit for 1 or 2 teaching practicums before the policy was changed and the course requirement was removed.

Responsibilities

- Time Commitment: Anticipate dedicating approximately 10-12 hours per week to teaching assistant duties. This information is communicated to research advisors and class instructors who are each asked to honor it.
- Varying Assignments: Note that Teaching Practicum assignments vary in effort, experience type, and degree. Students with queries about their duties or the assignment process should contact the Graduate Program Director.
- No Pressure: Students should not feel pressured by faculty to complete additional teaching practicums beyond the requirements and can report such instances to the Graduate Program Director.

Training and Resources

- Workshops and Resources: All Teaching Assistants must complete the SSoE's New Teaching Assistant workshop offered through Engineering Education Research Center. Teaching Assistance are encouraged to attend additional workshops provided by the University of Pittsburgh TA Services. Recommended reading includes the TA Handbook and other available resources.

Additional Opportunities

- BioE Teaching Practicum Experience: Students have the option to earn the "BioE Teaching Practicum Experience". To earn this, students must complete a 1-credit course on teaching STEM courses and achieving at least "Associate Level" certification through Pitt-CIRTL. PhD students completing both requirements and two Teaching Practicums can also reduce required seminars by 1. We encourage students completing this experience to list it on their CV.
- MS Students: MS (thesis) students can qualify to reduce their number of seminars by 1 simply by taking the teaching STEM course and completing one Teaching Practicum (i.e., are not required to complete the Associate Level certification to earn the seminar release).

3.12. Credit Load and Full-Time Dissertation Hours (FTDH)

Full-time Status: Graduate students who register for 9 to 15 credits in the fall or spring term are full-time students and are assessed at the current tuition rate. The Department of Bioengineering strongly recommends that every student receiving financial support (i.e., a tuition waiver) should register for 15 credits each term.

PhD students who have completed all credit requirements for the degree, including any minimum dissertation credit requirements (See Section 6.1 regarding more details around BIOENG 3997 requirements) and are working full-time on their dissertations should be

designated as “Full-Time Dissertation Hours,” which carries no credits or letter grade but provides students full-time status. Students who are enrolled in this status are assessed at a substantially reduced tuition fee than the normal full-time tuition rate. Once a student enrolls for FTDH, they are no longer eligible to take any courses. Please note that FTDH is not necessarily a requirement of the program and that it is possible but uncommon to graduate without having been on FTDH. Students eligible and ready to be FTDH should email the graduate administrator.

3.13. Independent Study Courses

An independent study (a.k.a., “special project”) course (i.e., 2095 or 3095) can count toward PhD or MS credit requirements. P*rior approval by the Graduate Program Director must be obtained with a compelling reason of why these courses meet a need that is not provided in traditional courses.* Many professional MS students use this course to receive credit for lab work or internships. In general, these courses should be limited to fulfilling elective requirements, but in extenuating circumstances credit toward non-elective courses can be considered. The student must submit an Independent Study Approval Form (note that the “advisor” line in the form refers to the advisor of the independent study and not the student’s advisor/principal investigator) to the Graduate Administrator, who will indicate whether or not the student has previously taken an independent study course (it is unusual, but potentially allowable, to have more than one such course count toward requirements). Once the Graduate Administrator verifies this, the form will be sent to the Graduate Program Director for approval. The student must submit a new Independent Study Approval Form each term in accordance with university course registration deadlines. Bioengineering permits a maximum of 6 credits from independent study to be used toward the graduation requirement.

3.14. Auditing Courses

A student may choose to audit any graduate course on a space available basis. After obtaining the instructor’s permission to audit a course, the student must follow the same procedures as registering for credit. Tuition is assessed for all audits. An N is an appropriate grade for courses audited. Students cannot switch from credit to audit after the end of the add/drop period (usually the second Friday of the semester). Audited courses cannot be applied toward fulfillment of the graduate degree. To audit a course, students should request an Audit Request Form from the Graduate Administrator. This form should be completed in conjunction with the instructor of the course and then submitted to ssoeadministration@pitt.edu. More information on University wide grading policies can be found here.

3.15. Academic Integrity

Students have the right to be treated by faculty in a fair and conscientious manner in accordance with the ethical standards generally recognized within the academic community (as well as those recognized within the profession). Students have the responsibility to be honest and to conduct themselves in an ethical manner while pursuing

academic studies. Should a student be accused of a breach of academic integrity or have questions regarding faculty responsibilities, procedural safeguards including provisions of due process have been designed to protect student rights. The Swanson School of Engineering Academic Integrity Policy including the review and appeal process can be found here.

4. FACULTY ADVISING AND FUNDING FOR RESEARCH MS AND PHD STUDENTS

4.1. Selecting an Advisor

Advisors and students often seek matches during the graduate recruitment process. It is a student's right to be able to work with any faculty member who is willing and able to accept the student as an advisee. Students should select an advisor as soon as possible to enable them to start working toward their research. Incoming students are expected to inform the Graduate Administrator and anyone else relevant to the situation as soon as a match is identified. There must be a mutual agreement between the advisor and student to begin a research-based academic program. Many bioengineering students have an advisor with a primary appointment in a different department. This is permitted as long as that faculty advisor has a secondary appointment in the Department of Bioengineering.

A faculty member that plays a particularly significant role in the graduate research of a bioengineering graduate student can be designated as Co-Advisor for that student. The principal advisor would still be responsible for the student's academic and research oversight and would be responsible for making final decisions when advisor approval is needed.

4.2. Changing an Advisor or Degree Program

If a graduate student or their advisor has decided to change a student's advisor for any reason, it is necessary for the Graduate Program Director and Department Chair to be informed in writing. This documentation should include the reasons for the requested change and should be copied to all involved parties. It should also provide an indication as to how the transition will take place such that it is as amenable to all parties as possible. If a student has any issues with an advisor during the program, it is important for the student to inform and meet with the Graduate Program Director and, if deemed necessary, the Department Chair as soon as possible to discuss options regarding resolution or a change in advisor.

It is important to note that any student contemplating a change of degree program let the Graduate Program Director and Graduate Administrator know as quickly as possible so that the degree program may be changed and that the necessary actions be taken for a change of academic plans.

5. MASTER OF SCIENCE (MS) & CERTIFICATES IN BIOENGINEERING PROGRAMS

The MS degrees in bioengineering are primarily designed for students with an undergraduate degree in engineering, although accommodations can be made for students with other backgrounds on a case-by-case basis via specially designed programs. MS degrees may be pursued as either a Professional MS program (for practicing engineers interested in professional or industry careers) or a Research MS program. The graduate certificate in medical product innovation, available to students in any university graduate program, imparts skills for effective collaboration in multi-disciplinary teams, guiding participants through the entire medical innovation process—from ideation of medical technology to development, realization, and commercialization.

5.1. Research MS Program

The Research MS program requires a total of 30 credits, which includes:

- Graduate Engineering Mathematics—3 credits
- Biostatistics—3 credits
- Societal, Political, and Ethical Issues in Bioengineering—3 credits
- Life Sciences—3 credits
- Elective—3 credits
- Track Courses—9 credits (from a menu of courses for specific tracks)
- MS Thesis—6 credits
- Teaching Practicum—1 semester
- Bioengineering Seminar—0 credit (students take either the 1-credit BIOENG 2023 or the 0-credit BIOENG 2024 during 3 semesters)

Total of 30 credits

Typically, completion of the Research MS program requires two years. Within the first year of enrollment (preferably before the student begins the program), the MS candidate is expected to finalize an advisor who will guide their thesis research and a general area in which they will write a thesis in coordination with their advisor. The student (under the guidance of their advisor) should select a thesis committee at some point during their program. The committee should consist of the student's advisor (who will act as the Chair of this committee), and at least two additional faculty members, one of which must have an appointment in the Department of Bioengineering. The student must apply for approval of the committee from the Graduate Program Director (contact Graduate Administrator for procedures). The student's advisor needs either a primary or secondary appointment in the Department of Bioengineering. The committee meets at least once a year after it is formed.

The thesis represents a comprehensive written record of the students' MS research activities. The thesis is typically organized into several chapters. The student submits the completed thesis to their committee two weeks prior to the scheduled defense. During the defense (also known as the Comprehensive Examination), the student presents the research included in the thesis to the committee for approximately 30-40 minutes. After the defense, the thesis committee returns a decision of whether the student passes the exam and the revisions that are required to the written thesis. The thesis is published

after approval of the committee and successful completion of all other graduation requirements including the public defense. Students should consult Sections 7.5 to 7.7 and 7.9 for information pertaining to thesis formatting and defense information.

The thesis committee has the responsibility to advise the student during the progress of their research and has the authority to require high-quality research and/or the rewriting of any portion or the entire thesis. The committee may meet periodically to provide the student guidance during the thesis process. The committee conducts the final oral examination and determines whether the thesis meets acceptable standards.

Timeline for Typical Completion of Didactic Courses

Year 1, Semester 1		Year 1, Semester 2	
Life Science 1	3 credits	Track Course 1	3 credits
Math Course 1	3 credits	Track Course 2	3 credits
Statistics	3 credits	BioE Seminar	1 credit
BioE Seminar	1 credit	Thesis credits	8 credits
Total	10 credits	Total	15 credits

Year 2, Semester 1		Year 2, Semester 2	
Track Course 3	3 credits	Teaching Practicum	0 credits
Ethics	3 credits	Thesis credits	15 credits
BioE Seminar	1 credit		
Thesis Credits	8 credits		
Total	15 credits	Total	15 credits

Research MS Typical Timeline for Thesis Requirements

The following table presents the key steps required to obtain the Research MS. Reasonable variations are acceptable.

MS Timeline

Step	**Event**	**When**
1	Select an academic advisor	Before admission of the start of the first term
2	With an advisor, construct a tentative plan of study (this is for student and advisor use only)	End of first term (and updated over time as necessary)
3	Finish taking core courses	By end of second or third term
4	Complete teaching practicum	During the first or second year
5	Select thesis committee and have it approved by the Graduate Committee	By third semester/end of first year
6	Committee meetings	As needed per student and advisor discussions

7	Complete research; write thesis	Year 2
8	Submit thesis to committee	At least 2 weeks before defense
9	Schedule thesis defense*	At least 3 weeks (preferably 6-8 weeks) before defense
10	Apply for graduation	Last term of attendance and every term in which there is a possibility of graduation, as required by the University
11	Submit final electronic copy of thesis to the ETD website	ETD Deadline as per Engineering Administration
12	Pay all necessary fees for thesis submission	ETD Deadline as per Engineering Administration
13	Submit electronic copy of thesis to department office (Graduate Administrator) and committee members	End of last term

*All MS thesis defense dates must be coordinated with the Graduate Administrator. The student is responsible for this, and should provide title, date, and location of the defense so the Graduate Administrator can inform the school at least two weeks in advance of the defense. The defense must be rescheduled if less than two weeks' notice is provided.

5.2. Professional MS-Medical Product Engineering Program

The Professional Master's Degree in Medical Product Engineering (MS-MPE) emphasizes instruction in professional skills and practices and serves as preparation for careers in medical product/services and related professions. Details regarding the key benefits of the program are communicated on our website.

The 30-credit, non-thesis, professional MS-MPE degree program is available for qualified students accepted by the Department of Bioengineering. For detailed information, interested students should contact the Director of Professional Masters' programs. For fulfillment of the required BioE seminar credits, a zero-credit seminar course (BIOENG 2024) focusing on professional development is offered for professional MS students.

A typical sequencing of courses includes:

Year 1, Fall		Year 1, Spring	
Core: BIOENG 2150 - Medical Product Ideation	3 credits	Core: BIOENG 2151 - Medical Product Development	3 credits
1 elective courses	3 credits	Core: BIOENG 2170 - Clinical Bioengineering	3 credits
1 math course	3 credits	1 elective	3 credits
BIOENG 2024	0 credits	BIOENG 2024	0 credits
Total	9 credits	Total	9 credits

If you notice incorrect or important missing information, please provide feedback.

Year 1, Summer		Year 2, Fall	
Internship* (BIOENG 2095)	3 credits	Core: BIOENG 2171 - Medical Product Prototyping	3 credits
		BIOENG 2241 – Medical Ethics	3 credits
		1 elective	3 credits
		Total	9 credits

*Full-Time students are required to complete a full-time internship (paid, unpaid, or for credit) with an industry partner or related entity. This internship can be taken in another semester but is most commonly completed over the summer. Students can earn up to 3 credits for their internship through BIOENG 2095.

One of the elective courses must be used to complete the graduate engineering mathematics or statistics requirement.

Popular elective courses taken by MS MPE students are listed on our website.
The student in the Professional MS program must maintain a 3.00 cumulative GPA to remain in good standing within the program.

Students who are accepted and enrolled in the Professional MS program and who subsequently wish to enter the Research MS Program or PhD Program can do so after applying specifically for that graduate program. Please consult the Graduate Administrator for more details.

5.3. Professional MS-Neural Engineering and Other Focus Areas

This focused curriculum in the non-thesis MS in Bioengineering program prepares students to work in the exciting and dynamic field of neural engineering including neural prosthetics, brain-computer interface systems, epilepsy monitoring, deep brain stimulation, engineering approaches to psychiatric disorders, and brain-inspired computation. It is a fast-growing field that provides clinical and technological benefits.

Neural engineering students will pursue didactic coursework that builds core competency in at least two areas. Example concentration areas include but are not limited to:

- Brain-computer interfaces
- Neuraltissue interfaces
- Neuralimaging and signals
- Neuraldevices and neuromorphic engineering

The concentrations for core competency will be selected in consultation with the Director of the MS-Neural Engineering Focus and will take into consideration the student's previous training and career aspirations.

The course requirements for the MS in Bioengineering (professional track) include the following:

- 12 credits in Concentration 1 (see here for examples of concentrations and courses in different concentrations)
- 9 credits in Concentration 2
- 3 credits in life science
- 3 credits in medical ethics
- 3 credits in mathematics/statistics
- 0 credit seminar (BIOENG 2024) every semester

Total number of credit hours - 30 credits (not including seminar requirements, and in addition to credits from foundational courses, if taken). All students must maintain a 3.0 GPA at all times to remain in good standing in the program. All non-thesis MS students will also register for a zero-credit seminar (BIOENG 2024) that focuses on professional development. The student will be assigned an advisor who is typically the Program Director for the MS-Neural Engineering focus area.

Full-Time students are strongly recommended to complete a full-time internship (paid, unpaid, or for credit) with an industry partner or related entity. This internship can be taken in another semester but is most commonly completed over the summer. Students can earn up to 3 credits for their internship through BIOENG 2095.

To complement our existing Professional MS in Bioengineering – Neural Engineering Focus program, we now offer the following additional focus areas:

- Biomechanics,
- Tissue Engineering and Regenerative Medicine (TERM),
- Molecular, Cellular and Systems Engineering (MCSE)
- Data Science, Imaging and Sensors (DSIS)

This 30-credit master's program lets you design a customized curricular plan to be completed in a year by taking advanced courses and participating in hands-on experiences (including a required independent study course) to acquire domain knowledge and technical expertise that align with your career aspirations. This program is ideal for individuals seeking research/technology-related careers in industry or other settings (e.g., university-based laboratories, clinical laboratories, government research and/or regulatory organizations). This program is also beneficial to individuals planning to pursue additional educational opportunities (e.g., PhD, medical school, IP law).

Students who are accepted and enrolled in the Professional MS program and who subsequently wish to enter the Research MS Program or PhD Program can do so after applying specifically for that graduate program. Please consult the Graduate Administrator for more details.

5.4. Dual MBA/MS in Engineering

The Department of Bioengineering and the Katz Graduate School of Business (KGSB) offer a dual MBA/MS program. Program requirements for the MBA are coordinated by the

Joseph M. Katz Graduate School of Business and students should direct questions about this part of the program to the School of Business. It should be noted that other courses that may be appropriate that are not on the list can be considered for approval by the Graduate Program Director. The following requirements are for the MS in Engineering component only:

Foundation Courses

- BQOM 2401 - Statistical Analysis: Uncertainty, Prediction & Quality Improvement (3 credits)
- BIOENG 2241 - Societal, Political, Ethical Issues in Biotechnology** (3 credits)

**Please note that the ethics course is a requirement even for those students who have had an ethics course as an undergraduate student, even if at the University of Pittsburgh.

Bioengineering Core Medical Product Engineering Courses

- BIOENG 2150 - Medical Product Ideation (3 credits)
- BIOENG 2151 - Medical Product Development (3 credits)
- BIOENG 2170 - Clinical Bioengineering (3 credits)
- BIOENG 2171 - Medical Product Prototyping (3 credits)

Other Requirements

Bioengineering Track Electives*** (9 credits)

Bioengineering Seminar

- All students must register for the zero-credit (BIOENG 2024) or the one-credit seminar (BIOENG 2023) each term if they are enrolled full-time until they have completed three semesters of seminar.

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Projects Course

- BIND 2200 & BIOENG 2095- Integrated MBA/MS Project - Joint with KGSB (3 credits)

*** The requirement of primary track courses implies that students would choose a specialty focus or "track" within Bioengineering, which currently consists of Biomechanics, Bioimaging and Signals, Molecular Cellular and Systems Engineering, Neural Engineering, Tissue Engineering and Regenerative Medicine, and Medical Product Engineering. With the advisor's approval, students could take courses from multiple tracks that either logically fit together or help fulfill the student's educational objectives.

5.5. Certificate in Medical Product Innovation

The Graduate Certificate in Medical Product Innovation (C-MPI), offered by the Department of Bioengineering in conjunction with the Center for Medical Innovation, is multi-faceted, reflecting the multidisciplinary nature of medical innovation.

Certificate candidates must complete a minimum of 5 courses (15 credits) drawn from the following:

Medical Product Innovation (2 courses)
- BIOENG 2150 - Medical Product Ideation
- BIOENG 2151 - Medical Product Development

Entrepreneurship/Engineering Management (select one)
- BSEO 2531 - Entrepreneurship and New Venture Initiation
- BSPP 2111 - Commercializing New Technologies
- IE 2003 - Engineering Management
- IE 2039 - Entrepreneurship for Engineers
- IE 2076 - Total Quality Management

Legal Aspects of Medical Product Engineering (select one)
- LAW 5135 - Commercializing New Technologies
- LAW 5210 - Patent Law
- LAW 5260 - Intellectual Property
- LAW 5631 - Law and Entrepreneurship

Medical Ethics (select one)
- BIOENG 2241 - Societal, Political, and Ethical Issues in Biotechnology
- BIOETH 2661 - Theoretical Foundations
- BIOETH 2664 – Bioethics
- NURS 2308 – Ethical and Social Implications of Biotechnology

A special program is available for UPMC Anesthesiology and Perioperative Medicine Resident Physicians that integrates this certificate within their residency program. Such residents should consult this website: https://www.anesthesiology.pitt.edu/education-training/anesthesiology-residency/pittrack. Given that the residents will already have completed medical school, which includes ethics coursework, students can request to transfer three credits of coursework from their prior medical degree for the Medical Ethics requirement.

6. DOCTOR OF PHILOSOPHY (PHD) PROGRAM

The Doctor of Philosophy Program in the Department of Bioengineering emphasizes our excellence in bioengineering research and education and combines hands-on experience with the biology and engineering fundamentals that students need to advance themselves in research, medicine, industry, and related professions. The PhD curriculum includes requirements in advanced engineering mathematics, statistics, life sciences, and other areas as prescribed in the course requirements.

Students pursuing the PhD degree are required to pass a preliminary examination (also known as the qualifying exam or qualifier) at the end of their first year of graduate study. Students pursuing the PhD are required to complete two teaching practicums and present

a PhD proposal (which also counts as the comprehensive exam), typically near the end of their second or during the third year. Each PhD candidate makes a final, public PhD thesis defense to fulfill the requirements for the PhD degree.

6.1. PhD Requirements

The course requirements for the PhD in Bioengineering include the following:

- Grant Writing in Bioengineering - 1 credit (BIOENG 2900/BIOENG 2901)
- Graduate Engineering Mathematics - 3 credits (approved math courses)
- Statistics for Bioengineers - 3 credits (approved statistics courses)
- Societal, Political and Ethical Issues in Bioengineering* - 3 credits
- Life Sciences - 6 credits (approved life science courses)
- Track Courses - 9 credits (from menu of courses for specific track)†
- Graduate Electives - 6 credits †
- Teaching Practicum - 2 semesters
- Seminar** - 6 credits total (See Section 3.10 for additional details)
- Doctoral Dissertation Research – variable credits but minimum of 30 credits (before proposal, BIOENG 3997; after proposal, BIOENG 3999)***

Students may petition the track chair (in case of track courses) or the Graduate Program Director (for other courses) if they wish to substitute a course that has not yet been approved. In this case, students should present evidence (ideally a syllabus but a course description may be sufficient) and their rationale for why the course should count towards a certain requirement. For more information on PhD Course and Credit Requirements, please see the "Course and Dissertation Credit Requirements" section of the SSoE Graduate Catalog.

*Please note that ethics is a requirement even for those students who have had an ethics course as an undergraduate student, even if at the University of Pittsburgh.

**Please note that 2 seminars of the 6 required may be non-BioE seminars (or seminars outside of BIOENG 2023).

† The standard policy for PhD students is 9 credits of track courses and 6 credits of electives. There is an exception for the Bioimaging and Signals track, for which the requirement is 12 credits of track courses and 3 credits of electives. DPT-PhD students in this track must take all four track courses, in which case only 3 elective credits are waived.

* **A total of 72 credits is required to receive a PhD in Bioengineering. Please note that the total number of required research credits from BIOENG 3997 and BIOENG 3999 may vary depending on other courses/credits to meet these 72 total credits. Lastly, note that remedial (undergraduate) courses do not count towards this total.

Other Notes and Reminders:

- A minimum of 30 dissertation research credits (BIOENG 3997 or BIOENG 3999) are required for graduation.
- A full-time PhD student not on FTDH must register for at least 3 research credits per term. It is recommended that 3997 credits be used to bring the total credit hours for each semester to 15 (maximum allowable for full time students without having to pay extra).
- Students should refer to section 3.12 regarding the full-time dissertation hours policy
- Once a student registers for post-proposal dissertation research (BIOENG 3999), they must continue to register for dissertation research in successive terms (not including the summer term) until the student reaches full-time dissertation status or until the final dissertation defense has been passed.
- Sometimes, dissertation credits are given "I" grades on transcripts that are changed to S grades after successful completion of the dissertation defense.
- It is the responsibility of the student to make sure that all dissertation requirements are fulfilled by the time of graduation. The graduation checklist (Section 7.8) is the best resource for verifying that all requirements are fulfilled. Students may wish to check in with the department Canvas page (see section on Graduation tasks) and then with the Graduate Administrator if they have or want confirmation that all requirements are fulfilled.

6.2. Typical Timeline of PhD courses and requirements

Completion of the program usually requires four to five years, with a typical sequence for the first three years as given below.

Year 1, Fall		Year 1, Spring	
Life Science 1	3 credits	Life Science 2	3 credits
Math Course 1	3 credits	Track Course 1	3 credits
Statistics	3 credits	BioE Seminar	1 credit
Grant Writing	1 credit		
BioE Seminar	1 credit		
Total	15 credits	Total	15 credits

Students must enroll in 15 credits per term, usually the difference between other courses and 15 credits is made up with BIOENG 3997 (pre PhD Candidate) or BIOENG 3999 (PhD Candidate) credits.

(PhD Preliminary Exam taken in summer after the first full year of graduate study has been completed.)

Year 2, Fall		Year 2, Spring	
Teaching Practicum 1	0 credits	Track Course 3	3 credits
Elective 1	3 credits	Elective 2	3 credits
Track Course 2	3 credits	Non-BioE Seminar	1 credit

BioE Seminar	1 credit		
Total	15 credits	Total	15 credits

Year 3, Fall		Year 3, Spring	
BioE Ethics	3 credits	BioE 3997/3999*	14 credits
Non-BioE Seminar	1 credit	BioE seminar	1 credit
Teaching Practicum 2	0 credits		
Total	15 credits	Total	15 credits
PhD Proposal Defense occurs after this term		FTDH for rest of time in program after the third year, IF the proposal and 3997 credits have been completed.	

6.3. PhD non-Didactic Timeline

The following table presents a typical timeline that students in the PhD program should try to follow – reasonable variations from the schedule shown are entirely acceptable.

Step	Event	When
1	Select an initial academic advisor	Before enrolling or soon after admission to program (Section 4.1)
2	With advisor, construct a tentative plan of study (this is for the student's and advisor's use only)	End of first term (and updated over time as necessary, Section 3.9)
3	Finish taking core courses (Life science, math, statistics)	By end of second term (Section 6.1 for course requirements)
4	Preliminary Examination	During summer after completing 2 semesters of study (Section 7.1)
5	Select dissertation committee and have it approved by the Graduate Program Director	By the end of the 2nd year PLEASE NOTE: The student must get their committee approved by the Graduate Program Director BEFORE their proposal. This can be done by submitting the form for the committee approval found on the forms page of the website. (Section 7.2)
6	Committee meetings	A pre-proposal meeting is recommended. After proposal, at least once every academic year (Section 7.2)
7	Proposal	End of second year or during third year (Section 7.3 and 7.4)
8	Complete research and write dissertation	Years four and/or five (Sections 7.5 and 7.6)

9	Schedule dissertation defense*	During fourth or fifth year, ideally at least 6 weeks ahead of the defense (Section 7.7)
10	Apply for graduation	Last term, as required by the University (Section 7.8)
11	Submit dissertation to committee	At least two weeks before defense (Section 7.7)
12	Submit final electronic copy of dissertation to ETD Website	ETD Deadline as per SSoE Administration. (Students must adhere to the ETD deadline for each term and be certain that all edits are completed to the thesis before the deadline for each term.) (Section 7.9)
13	Submit electronic version of dissertation, along with all other needed paperwork to Graduate Administrator and committee members	This should also be completed before the ETD deadline. (Section 7.9)

*All PhD dissertation defense dates must be coordinated with the Bioengineering Graduate Administrator. The student is responsible for scheduling their dissertation defense, and should provide title, date, abstract, and location of the defense so the Graduate Administrator can inform the school at least two weeks in advance of the defense. The defense will be rescheduled if less than a two-week notice is provided.

6.4. Medical Doctor (MD)-PhD Program

The mission of the University of Pittsburgh-Carnegie Mellon University Medical Scientist Training Program (MSTP) is to prepare its students to become leading physician-scientists who will make discoveries that will significantly advance health and lower the burden of disease. The training program links 24 PhD programs in twelve graduate schools within the University of Pittsburgh and Carnegie Mellon University. The University of Pittsburgh Bioengineering program is one of these participating PhD programs. For more information on this MD/PhD program, visit the following website.

Compared to the straight PhD student, a typical MD/PhD student makes an additional commitment of between 7 and 11 years of education in medical school, residency, and fellowships. In recognition of this and considering overlapping areas, the department makes certain accommodations in the requirements for completing the PhD degree. For example, students in the MD/PhD program exceed the basic life science requirements for the Bioengineering PhD program, and thus this requirement is fulfilled by the medical school curriculum. We typically accept medical school requirements coursework to fulfill the life science (6 credits), elective (6 credits), and grant writing workshop (1 credit). However, MD/PhD students cannot use their MD courses to opt out of the advanced engineering/math course requirements for the PhD.

The course requirements for the MD/PhD in Bioengineering are modified to include the following (see Section 6.1 for additional notes and exceptions):

- Track Courses – 9-12 credits (from the menu of courses for specific track)*
- Graduate Electives – 6-3 credits* (fulfilled by passing all components of MED 5116 or equivalent)
- Life Sciences – 6 credits (fulfilled by passing all components of MED 5218 or equivalent)
- Ethics – 3 credits. The department does not enforce the 3-credit ethics requirements for MD/PhD students if they have acquired this knowledge through their medical school education. Note that these three credits are not waived. Students must acquire these three credits through another course (didactic or graduate project).
- Graduate Engineering Mathematics - 3 credits (approved math courses)
- Statistics for Bioengineers - 3 credits (approved statistics courses)
- Teaching Practicum - 2 semesters
- Seminar** - 6 credits total
- Grant Writing in Bioengineering - 1 credit (BIOENG 2900). The department does not enforce this 1-credit requirement for MD/PhD students if they have acquired this knowledge through their medical school education. Note that this 1 credit is not waived. Students may acquire the credit through research credits.
- Doctoral Dissertation Research – minimum of 30 credits (before proposal, BIOENG 3997)

*The standard policy for PhD students is 9 credits of track courses and 6 credits of electives. There is an exception for the Bioimaging and Signals track, for which the requirement is 12 credits of track courses and 3 credits of electives. If a student is in this track, their medical school coursework can only be used for 3 credits of electives.

Total number of credit hours: 72 credits (remedial courses do not count towards this total). Typically, completion of the program requires four years, although it may require only three years for exceptionally focused students with a prior MS degree.

See Section 6.3 for non-didactic timeline requirements of an MD/PhD program. These requirements are the same for MD/PhD students as PhD students.

6.5. Doctor of Physical Therapy (DPT)-PhD in Bioengineering Program

The Doctor of Physical Therapy (DPT) - PhD in Bioengineering program combines the entry-level DPT leading to licensure as a physical therapist, with a PhD in Bioengineering that will prepare the student to become an independent researcher. The program will integrate clinical and research experiences, with students receiving mentorship from faculty in the departments of Physical Therapy and Bioengineering. Students should have a bachelor's degree or higher in engineering or engineering-related discipline, with a strong interest in physical therapy.

If you notice incorrect or important missing information, please provide feedback.

Our rigorous curriculum is built around 4 key areas: basic science, clinical science, leadership & professional development, and critical inquiry. The DPT plan of study integrates the basic sciences and clinical practice, emphasizes evidence-based practice and includes a comprehensive array of course offerings in musculoskeletal, neuromuscular, integumentary, cardiopulmonary, geriatric, and pediatric physical therapy, as well as course content related to leadership, professional development, and evidence-based practice.

We want to make sure our graduates are well prepared to enter the workforce, so we complement our didactic education program with a clinical program that includes 42 weeks of full-time clinical experience. The curriculum is designed to emphasize early and intensive integration of our students into the clinical environment throughout their educational program. Our students begin their clinical affiliations during the 2nd semester in the program and conclude with two consecutive 15-week term clinical education experiences.

During the DPT program, usually in Terms 4 and 5, students will complete research lab rotations in the labs of potential PhD advisors. These rotations are typically arranged in Terms 2 and 3 of the DPT program by having discussions with Professor Sparto and the potential PhD advisors.

University of Pittsburgh
Department of Physical Therapy
School of Health and Rehabilitation Sciences

Fall Term 1 (17 credits)	Spring Term 2 (20 credits)	Summer Term 3 (19 credits)
Courses	Courses	Courses
Human Anatomy and Lab (6)	Neuroscience (4)	Survey of Human Disease II (2)
Kinesiology (4)	Musculoskeletal I (6)	Musculoskeletal II (5)
Cardiopulmonary PT I (4)	Cardiopulmonary PT II (2)	Neuromuscular I (4)
Patient Management I (3)	Survey of Human Disease I (2)	Patient Management 2 (3)
	Leadership & Prof Dev I (2)	Leadership & Prof Dev II (3)
	Clinical Education I (4)	Evidence Based Practice I (2)
		Clinical Education II

Fall Term 4 (20 credits)	Spring Term 5 (12+ credits)	Summer Term 6 (9 credits)
Courses	Courses	Courses
Pharmacology (3)	Neuromuscular III (2)	Evidence Based Practice IV (1)
Patient Management III (2)	Geriatric PT (2)	Terminal Clinical Education III (8)
Neuromuscular II (4)	Medically Complex Pt. (1)	
Growth & Development (3)	Health & Wellness (1)	
Leadership & Prof Dev III (2)	Musculoskeletal III (4)	
Evidence Based Practice II (2)	Electives	
Clinical Education II cont'd (4)	Evidence Based Practice III (2)	

Fall Term 7 (9 credits)
Courses
Evidence Based Practice V (1)
Terminal Clinical Education IV (8)

Basic Science
Clinical Science
Critical Inquiry
Leadership & Prof. Development
Clinical Education

DPT Curriculum for Residential and Hybrid Formats

The first term begins in late August and students graduate 2.3 years later in December. The first 5 terms are comprised of both didactic instruction as well as full-time clinical experiences. The curriculum concludes with two 15-week terminal clinical educational experiences (Summer-Fall)

We want to make sure our graduates are well prepared to enter the workforce, so we complement our didactic education program with a clinical program that includes 42 weeks of full-time clinical education experience. The curriculum is designed to emphasize early and intensive integration of our students into the clinical environment throughout their educational program. Our students begin clinical education during the second term in the program and end with 30 consecutive weeks of clinical education after the didactic plan of study.

If you notice incorrect or important missing information, please provide feedback.

*The DPT program is set by the Department Physical Therapy (PT) and may change over time. The above information is accurate for the DPT requirements as of 2024. If the above section deviates from requirements indicated by the PT department, their guidelines take precedence over the information in this document. For more information, see https://www.shrs.pitt.edu/dpt.

The Department of Bioengineering follows university guidelines on students working toward joint degrees like the DPT-PhD in Bioengineering. Typically, we have waived the life science requirement (6 credits) as comparable coursework is covered in the physical therapy curriculum. The remaining course requirements closely follow requirements for the PhD in Bioengineering (see Section 6.1 for additional notes and exceptions).

- Grant Writing in Bioengineering - 1 credit (BIOENG 2900)
- Graduate Engineering Mathematics - 3 credits (approved math courses)
- Statistics for Bioengineers - 3 credits (approved statistics courses)
- Societal, Political and Ethical Issues in Bioengineering - 3 credits
- Track Courses - 9 credits (from menu of courses for specific track)*
- Graduate Electives – 6 credits *
- Teaching Practicum - 2 semesters
- Seminar - 6 credits total
- Doctoral Dissertation Research - 32 credits (before proposal, BIOENG 3997)

*The standard policy for PhD students is 9 credits of track courses and 6 credits of electives. There is an exception for the Bioimaging and Signals track, for which the requirement is 12 credits of track courses and 3 credits of electives. DPT-PhD students in this track must take all four track courses, in which case only 3 elective credits are waived.

Total number of credit hours: 72 credits minimum, which includes 6 credits to fulfill life science requirement but does not include credits from foundational courses if applicable.

DPT-PhD students are also required to complete two teaching practicums and no more than one practicum can be undertaken in a semester. There is no course registration for this educational experience, and fulfillment is monitored by the department.

Students typically take the PhD preliminary exam in the next summer term after they have completed 2 full terms in the program but it may be taken after only one term if approved by the Department. The PhD proposal (comprehensive examination) is typically presented at the end of the second year. A final public PhD defense is made by each PhD candidate based on the student's research work.

7. PHD PROGRAM BENCHMARKS AND MILESTONES

The department has created a Canvas page, “Bioengineering Graduate Program”, which has a lot of details that are relevant to students as they navigate each of the three major milestones (Preliminary Exam, Comprehensive Exam, and Dissertation Defense).

PhD students should ensure that they have access to this site and consult it for instructions when approaching each of these milestones. If you do not have access, please contact the Graduate Administrator.

7.1. Preliminary Exam

The purpose of the preliminary examination is to evaluate the student's ability to use fundamental principles of biomedical science and engineering approaches to investigate solutions to bioengineering problems. The basis of the examination is a specific research question (problem), chosen by the student. The student may seek assistance from their advisor or any other faculty member for choosing the topic. The examination will consist of an oral presentation and accompanying written document in NIH R03 format (see below and here for details about an R03 style grant). The written document and oral presentation should demonstrate the student's ability to think, present, and defend in an academic environment, as well as a sufficient background in the biomedical science and engineering aspects of the chosen problem. Students will receive an instructional document on the preliminary examination from the Graduate Program Director or their track chair in the fall of their first year. This document is regularly updated and may have newer information than the below section. Therefore, information from the Graduate Program Director or track chairs supersedes the information below in cases where there is a discrepancy.

The examinations will be coordinated within graduate tracks. They will typically take place during the summer after completing two semesters of graduate studies. The scheduling of the examinations will be handled by the track coordinators. Track coordinators also determine the suitability of the research topic by considering whether it sufficiently contains both engineering and biomedical science components. The student may get help from anyone (e.g., GradBMES, lab members, faculty, etc.) in preparing the oral presentation but must observe the usual strict standards on plagiarism in preparing the written document and presentation. Students are encouraged to focus on one to two aims and note both alternatives and potential problems within each aim. The proposed research should be achievable in approximately 2 years. Proper referencing of sources is required for both the oral and written components. The research proposal may be supported by preliminary data, but this is not a requirement. In addition, students must provide a written statement, signed by their advisor, to specify the student's independent contribution to the written document.

The track coordinator determines the composition of the examination committees, and the committee composition may vary across applicants based on faculty availability or to fit a student's research topic. The preliminary exam committee typically includes a broader spectrum of expertise than the dissertation committee and should include both biomedical science and engineering expertise. *The student's advisor (or mentor) is permitted to attend during the oral presentation but must remain silent.* The committee may solicit the advisor's input after the student has completed the exam and left the room. The review process will typically focus on probing the student with challenging questions to establish the depth of their creative and analytical thinking, as well as knowledge in

appropriate background areas. The examiners' questions will be broad enough to test the student's ability to critically think through unanticipated questions. Students are also encouraged to carefully consider details in the design of their oral presentation ("slide quality"), as this is will be evaluated during the exam. The review process typically places less weight on the impact of the research topic and/or feasibility of the proposed research methods. Thus, students who present an excellent research idea but who perform poorly in defending the idea or answering critical questions relevant to the topic may receive unsatisfactory outcomes.

The preliminary examination committee creates a recommendation that is transmitted to the full graduate committee. The recommendation is based on the combined evaluation of the written and oral components with four possible recommended outcomes: unconditional pass, conditional pass, retake (1st attempt), and fail (2nd attempt). The bioengineering graduate committee considers the preliminary exam committee's recommendation, input from department faculty members, and input from the research advisor. After deliberation, the graduate committee decides on the outcome and associated conditions in the case of a conditional pass outcome. All students will receive a letter (delivered by email) indicating the decision made by the graduate committee. Conditional passes will be accompanied by specific corrective actions, such as taking remedial courses or rewriting the proposal. Students must meet these conditions within a time period specified within the conditions. If the conditions are not met satisfactorily, the conditional pass is automatically converted to a retake or a failure outcome. Students will receive notification from the department when the conditions have been satisfactorily met and that the outcome has been converted to a pass. If a student is taking the exam for the first time and the committee has identified substantial deficiencies that cannot be remedied with a conditional pass, the student will receive a retake outcome. In this case, students may retake the preliminary examination one additional time (typically the following year). If a student is taking the exam for the second time and the committee has identified substantial deficiencies that cannot be remedied with a conditional pass, they will receive a fail outcome and may not proceed with the PhD program.

For more information on SSoE requirements for the Preliminary Exam, please see the SSoE Graduate Catalog under "Preliminary Evaluation" here. Students are also encouraged to take advantage of Preliminary Exam support provided by BMES (See Section 8.3)

General Timeline and Progression

(note that these dates are only rough and will be specified for each year's exam)

1. Written Instructions Provided – Early in fall semester
2. General Meeting with Graduate Program Director – Early in fall semester
3. Track Specific Meeting with the track chairs of the exam – Late in fall semester
   - Allows students an opportunity to seek out information on the basic knowledge that they will be tested on and expected to know during the exam.
4. Specific Aims Pre-approval (Abstracts Due) – Early April
   - The abstract is used by the track coordinator to assess the appropriateness of the proposed topic for the Bioengineering PhD Preliminary Exam. Approval of the topic

does not ensure (or assume) that the student will appropriately address those issues.

5. Proposal Submission – Mid-May
   - The written component is used to assess the ability of the student to appropriately address the chosen topic. The quality of this document is used to determine a student's written abilities as well as ascertain how well the student might address the topic in an oral setting. The candidate should keep in mind that the oral component will not cancel out an obvious deficiency in the written component. Although they can complement one another to some extent, students should be aware that each component is graded separately.
6. Oral Exams - Late May/early June
   - The candidate will be scheduled for an oral presentation to complete their Preliminary Examination. The time of the oral exam will be set by the Track Coordinator. The candidate should plan to present for no more than 20 minutes and expect around 20-30 minutes of questions.
7. Students Receive Notification of Final Result – Middle of June
   - Students will receive a notification of their outcome following a faculty review meeting shortly after the oral exams have concluded.

7.2. PhD Dissertation Committee

Forming the dissertation committee

After passing the preliminary examination, the doctoral student is expected to finalize the general area in which they will write a dissertation and an advisor who will guide the dissertation (if not already determined). *The doctoral student is expected to specialize in one of the department's tracks and take whatever additional courses are required to prepare for the PhD comprehensive examination and the dissertation.* By the end of the second year, the student (under the guidance of their advisor) selects a doctoral committee of four or more persons, for the approval of the Graduate Program Director.

The doctoral committee has the responsibility to advise the student during the progress of the candidate's research, must review and approve the proposed research project before the student may be admitted to candidacy, and has the responsibility to require high-quality research, and where appropriate, require the rewriting of any portion or the entire dissertation. It must also confirm that the dissertation contains acceptable engineering and biology/clinical content. It conducts the final oral examination and determines whether the dissertation meets acceptable standards.

Throughout the student's career, it is also important to remember that the dissertation committee is a valuable resource for a student to employ to obtain the opinions of other faculty with regards to their readiness to meet certain key milestones towards graduation. This is partly why students are encouraged to form their committees as soon as possible and why the department has a policy in which it clearly states that a student must complete their proposal during their third full year in the graduate program.

Students should select a committee that provides complimentary expertise that will enable them to develop a unique set of expertise. When inviting a scientist to join a committee, students are encouraged to provide a brief overview of their dissertation topic and how that individual's expertise fits into the collective expertise of the committee. In addition, the committee must meet the following guidelines:

- One member is the student's advisor, who will act as chair of this committee. The advisor needs to have a primary or secondary appointment in Bioengineering
- At least two additional faculty members are from the Department of Bioengineering (primary or secondary appointment)*
- At least one faculty member on the committee needs to have a primary appointment in the Department of Bioengineering
- At least one faculty member from outside of the Department of Bioengineering (this member cannot have a primary or secondary appointment in the Department of Bioengineering).*
- A majority of the committee, including the advisor, needs to have Graduate Faculty status*
- One committee member should come from outside the immediate research team (i.e., laboratory or center) of the student.

* Students are encouraged to ask prospective committee members (or the Graduate Administrator) regarding their primary/secondary appointments and Graduate Faculty status since information on an individual's website may be out of date.

In cases where one committee member is more active than typical in advising the student, that committee member should have the status of co-advisor or committee co-chair. The principal advisor is still in charge and makes final decisions.

Approval of the dissertation committee

To verify appropriate composition, each student must obtain approval by the Graduate Program Director of the proposed dissertation committee prior to the first official committee meeting, using this form ("Dissertation - Thesis Committee Approval Form").

Approval of the dissertation committee MUST be completed before the proposal. Once approved, the student will receive the candidacy form (previously known as the "blue form") from the Graduate Administrator, which must be filled out and signed by all committee members at the student's proposal.

Ongoing activities of the dissertation committee

Meetings of the doctoral candidate and their dissertation committee must occur at least annually from the time the student gains admission to doctoral candidacy. During these meetings, the committee will assess the student's progress toward the degree and discuss objectives for the following year and a timetable for completing degree requirements. This committee then oversees the student's dissertation research and the remainder of their PhD program. Students should report the outcome of the annual

overview prospectus meetings to the Graduate Administrator using this form. The duration of these meetings can vary but is typically approximately 1 hour.

An emeritus faculty member may remain as a member or chair of a committee if they are spending considerable time in Pittsburgh or its vicinity and remain professionally active. An emeritus faculty member who meets these criteria may also be appointed as a member or as a co-chair (but not the chair) of a newly formed committee. For more information on university-wide policies on Dissertation Committees, please see here.

The membership of the doctoral committee may be changed whenever it is appropriate or necessary, subject to the approval of the department chair and dean. When a doctoral committee member leaves the University, they must be replaced unless: 1) the dissertation is almost complete; 2) the member has an essential role on the committee; 3) the member is considered to be the member from outside the department; or 4) the member retains a courtesy appointment in the Department of Bioengineering. In case #4, the Graduate Program Director must approve. When the chair of a committee (i.e., the student's advisor) leaves and cannot be conveniently replaced, a co-chair must be appointed from within the Department, and the restructured committee requires the approval of the Graduate Program Director and the Dean. If the defense takes place within a few months of the committee chair's (i.e., the student's advisor) departure, the requirement of the co-chair is usually waived.

7.3. Comprehensive Examination (Dissertation Proposal)

The comprehensive examination (known as the dissertation proposal in the Department of Bioengineering) is designed to assess the student's mastery of the general field of doctoral study, the scope, feasibility, and rigor of the proposed dissertation, the student's acquisition of both depth and breadth in the area of specialization, and the ability to use the research methods of the discipline. Students and the committee should also consult Section 7.6 regarding the requirement for both engineering and biological/clinical content in the proposal. Students should consult the department's Canvas page regarding requirements as they approach their Comprehensive Examination.

The written proposal should follow the current NIH R01 proposal guidelines. More information on the R01 can be found here. Please note that the current R01 proposal guidelines mandate 1 page for the specific aims, 12 pages for a research plan, references (no page limit), and the animal and vertebrate sections (no page limit), if applicable. The other sections of an NIH R01 proposal are not necessary. Students should send their written proposal to their committee two weeks prior to the proposal date.

Students should schedule 2-3 hours for their oral proposal. Students should plan 35-45 minutes to present their proposal. Students should plan to engage in answering questions and discussion for approximately 60-75 minutes beyond their proposal presentation. After the presentation and discussion, the student leaves the room while the committee deliberates on the outcome of the proposal, corrective action (if applicable), and guidance to the student as their research progresses into the final stage.

The student should also be aware that per SSoE regulations, the proposal cannot be completed any sooner than one full term after the completion of the preliminary exam, and that students are encouraged to complete their proposals within two years after they complete the preliminary exam. Also, students must complete their proposal at least two semesters before their defense and graduation, per school regulations. In no case may the proposal be completed in the same term in which the student is to graduate. Additionally, a student's admission to candidacy (which occurs after the proposal is completed), must be at least two terms before graduation.

You must email the Graduate Administrator for the Application to Admission to Candidacy Form to be signed by your committee. It is best to complete this form via DocuSign on the day of your proposal. After the proposal is completed, the student is to email the signed form back into the Graduate Administrator, and the SSoE Administration Office will then process the form.

7.4. Formal Admission to Candidacy for the PhD Program

Admission to candidacy for the Doctor of Philosophy degree constitutes a promotion of the student to the most advanced stage of graduate study and provides formal approval to devote essentially exclusive attention to the research and the writing of the dissertation. To qualify for admission to candidacy, students must have obtained full graduate status and must have completed formal course work no later than one term after the student proposes, with a minimum quality point average of 3.00, passed the Preliminary Examination, and received approval of the proposed subject and plan of the dissertation from the doctoral committee (i.e., passed their dissertation proposal). Students are informed of admission to candidacy by written notification from the Dean typically 2-3 months after their dissertation proposal.

To authenticate fulfillment of required coursework, complete and email the PhD Course Requirements Form along with your Pitt transcript to both Graduate Program Director and Graduate Administrator. All incomplete grades, if any, must be converted to satisfactory or letter grades. Also, all credit transfer requests must be finalized. The Graduate Program Director's signature is required on this form to advance to candidacy.

7.5. Thesis/Dissertation Formatting and Other Requirements

The dissertation represents a comprehensive written record of the students' PhD research activities. The dissertation is typically organized into several chapters. The document is closely reviewed by the dissertation committee and is published after approval of the committee and successful completion of all other graduation requirements including the public defense.

Once a student has formally applied to graduate (instructions here), the SSoE Student Records Administrator will contact the student with instructions on how to submit their ETD for formatting approval. Students should submit a draft of their ETD as soon as

possible (it does not need to be a final draft – it can be updated prior to the ETD completion deadline) to have the formatting of your dissertation checked. Contact the SSoE Office of Administration (ssoeadministration@pitt.edu) or the Graduate Administrator with questions or problems.

For detailed information on how the PhD dissertation or MS thesis should be formatted, please consult the ETD site. Students may also see the ETD site for more information on university resources that are available for students preparing their ETDs including training and workshops, templates, online tutorials, FAQs, copyright and patent info.

Please consult the department's Canvas page for information, on departmental requirements for final submission of the dissertation, which are in addition to SSoE's requirements. The SSoE requirements can be found under "Electronic Thesis and Dissertation" and "PhD Dissertation" on the Graduate Catalog (found here) or communicated via SSoE staff over email.

7.6. Engineering and Biological/Clinical Content of Theses and Dissertations

The Bioengineering Department strives to produce students who are bioengineers, as opposed to more traditional engineers (e.g., electrical engineers, mechanical engineers, chemical engineers, etc.) or life scientists (e.g., cell biologists, molecular biologists, etc.). As such, all graduate thesis and dissertation committees are charged with ensuring that these documents contain a sufficient amount of both engineering and biological/clinical content. The dissertation committee should discuss the appropriateness of the proposed research to these criteria during the comprehensive exam and provide the student feedback as appropriate. Any concerns about either content are grounds for failure of the defense. Questions about this topic can be directed to the Graduate Program Director.

7.7. Final Oral Examination (Dissertation/Thesis Defense)

After the related research and the writing of the dissertation or thesis are completed, the student is required to defend their work in a final oral examination. This examination is conducted by the Doctoral/Master's Committee (hereafter "committee") and does not need to be confined to materials in and related to the dissertation/thesis. The student is responsible for arranging the date, time, and place for the dissertation/thesis defense, allowing two hours duration, in consultation with the committee. The student is required to give the committee copies of the written dissertation/thesis at least two weeks before the defense date unless the committee members agree to accept it closer to the time of the defense. The student is also required to provide the Graduate Administrator with the date, time, and place of the defense, as well as a copy of the dissertation/thesis abstract no less than two weeks before the defense date. Failure to adhere to any of these requirements will require the student to reschedule the defense date accordingly. In addition, students planning on defending in a given term are strongly encouraged to give their defense at least two weeks before the ETD deadline (email Graduate Administrator to identify the exact deadline, typically the deadline is about 3 weeks before graduation),

to enable the committees to provide feedback and give the student enough time to make corrections to their written thesis before final submission.

Though anyone may attend and participate in the examination, only members of the committee may be present during the final deliberations and may vote on the passing of the candidate. The student must give each committee member a "Rubrics Form" for Evaluating PhD Dissertation form before the oral examination with a copy of their CV or a list of accomplishments. The rubrics are returned to the Graduate Administrator and are not released back to the student.

For the dissertation/thesis defense, the student prepares and delivers a scientific presentation for a period of 40 minutes to one hour in length if uninterrupted. At the end of the presentation, the committee chair first invites questions from audience members who are not on the committee. Following this, the committee chair requests that everyone except the committee members leave the room and then each committee member is invited to ask the student questions. At the end of the defense, the student is asked to leave the room and the committee discusses the results of the defense and votes to pass or fail. If the decision of the committee is not unanimous, the case is referred to the Dean for resolution. The Chair of the Committee should ensure that the dissertation/thesis is in final form before requesting signatures of the members of the committee. If the student passes, the student finalizes the dissertation, taking into account all committee requests for changes. If the student fails, the student can repeat the defense once.

It is expected that MS theses will lead to at least one paper of publishable quality in a respected scientific journal, and that PhD dissertations will lead to at least two such papers. Advisors may have a higher number of expected manuscripts.

7.8. Graduation Checklist

- The department has provided detailed instructions on what to do in the semester preceding graduation as well as leading up to and then following the dissertation defense. Please consult the Bioengineering Graduate Program Canvas page and the Defense Information module for more information. Note that the SSoE also has requirements that students need to follow. These instructions will come via email for students who have applied to graduate.

7.9. Graduation Information and ETD Submission

An application for graduation must be filed during the term in which the student expects to graduate. The application should be filed as early as possible to prevent payment of a late fee. No applications for graduation will be accepted after the end of the late application period, which is almost always the same as the late-add drop deadline. Instructions for applying to graduate can be found here: https://www.registrar.pitt.edu/graduation-diplomas. The student is advised to check with the Graduate Administrator concerning the timing of this application. If a student is uncertain about completing work in the current term, the application should be filed. If

graduation is possible, an application should be filed since it can be withdrawn, whereas an application submitted after the late fee deadline will not be accepted. A new application must be filed for the term in which a student expects to graduate, even if an application for graduation was filed in a previous term. All graduate students must be FTDH status or registered (e.g., BIOENG 3999) during the term of graduation. In special circumstances where only minimal work is required to complete the thesis or dissertation, a student may request a waiver for one term only.

8. OTHER REQUIREMENTS

8.1. Residency Requirements

Full-time residency is highly desirable in a graduate program. However, SSoE recognizes the need for part-time study by persons employed in industry and allows accumulation of a portion of graduate credits on a part-time basis. For university information on residency and tuition guidelines information, students are encouraged to consult the following page.

8.2. Statute of Limitations

Requirements for the Research MS degree must be completed within a period of four calendar years from the student's initial registration for graduate study.

Requirements for the PhD must be fulfilled within a period of ten calendar years from the student's initial registration for graduate study; or, for the student holding an MS degree, within a period of eight calendar years from the first registration for graduate study following the receipt of an MS degree.

The Statute for the Professional MS degree is five years from the student’s initial registration as a student.

Except for time spent in the Armed Forces, the elapsed time after the student's initial registration will count toward the statute of limitations whether a student continues to register or not. Under extenuating circumstances, a student may request extension of the statute of limitation by writing to the Graduate Program Director with the advisor's approval. Extension is not granted as a matter of course; a student requesting extension should clearly state the circumstances and present evidence of the factors causing the program's delay. The department, in turn, will consider the circumstances, the evidence of diligence shown in fulfilling degree requirements, the major advisor's recommendation, and then grant or reject the request. In no case is an extension granted simply to prolong a student's graduate study.

8.3. Biomedical Engineering Society (BMES) and Other Professional Societies

The Graduate Biomedical Engineering Society Chapter at the University of Pittsburgh serves as the voice of the student body and organizes programming for students’ benefit. The BMES officers, elected on a yearly basis, act as the interface between the students

and the Bioengineering faculty. In addition to improving interaction in the department, the BMES chapter at Pitt coordinates a wide range of extracurricular activities to complement students' professional and academic development. These include social events, STEM and community outreach activities, professional development, and entrepreneurial activities. BMES also helps the department through organizing orientation, recruitment weekend, preliminary exam preparation, and Bioengineering Research Day. The ultimate goal of Pitt BMES is to help graduate students develop well-rounded and balanced lives while learning and preparing for career opportunities afforded by a graduate degree in bioengineering. All graduate students are automatically enrolled as members of the Graduate BMES. Contact email: GRADBMES@pitt.edu.

9. INFORMATION ABOUT OUR DEPARTMENT'S COMMITMENT TO DIVERSITY, EQUITY, INCLUSION, AND ACCESS

9.1. Departmental Philosophy

Our departmental philosophy concerning Diversity, Equity, Inclusion, and Access (DEIA) fundamentally aims to redirect attention from these terms, viewed largely as outcomes, toward the culture, community, and processes that foster a diverse, equitable, inclusive, and accessible department. We staunchly believe that through continuous efforts to cultivate a culture and community characterized by mutual respect and consideration for individual needs and identities, DEIA values will naturally emerge. This stance does not undermine the significance of DEIA; on the contrary, these terms serve as critical indicators of the progress made in enhancing our culture and community. However, mere adoption of these terms without substantive action does not genuinely reflect an inclusive culture. At its core, DEIA transcends superficial perceptions and resonates with an intrinsic motivation to engage in the challenging and introspective work required to ameliorate our community's culture. It is imperative to acknowledge that this philosophy embodies a collective commitment across our department, encapsulating our leadership, faculty, post-docs, staff, students (undergraduate and graduate), and alumni. Individuals or collectives who hold senior positions or roles of substantial, long-term impact bear a heightened responsibility toward our continual improvement, although it is the hope that everyone will embrace DEIA as fundamentally important each and evert day in all that we do as a department.

9.2. Resources for Graduate Students related to DEIA:

Disclose Veteran or Disability Status
https://www.pitt.edu/civil-rights-title-ix/disclose-your-veteran-or-disability-status

Religious Accommodations
https://www.wellbeing.pitt.edu/civil-rights-title-ix/religious-accommodations
University Level Anonymous Reporting (ethics and compliance topics, including Title IX, workplace discrimination, the University's response to COVID-19, financial controls, and more) (see department-level reporting system under Department Level Contacts)
https://pi.tt/concern

If you notice incorrect or important missing information, please provide feedback.

(800) 468-5768
(412) 903-3456

Civil Rights and Title IX Office (for mandatory reporting of discrimination or sexual misconduct)
titleixcoordinator@pitt.edu

Counseling Center
412-648-7930; After Hours: 412-648-7930 x1
https://www.studentaffairs.pitt.edu/counseling/services

Therapy Assistance Online (TAO)
https://my.pitt.edu/task/all/university-counseling-center-tao

School Level Contacts
Office for Diversity Affairs
Associate Dean Sylvanus Wosu
412-624-9842; eodadmin@pitt.edu

Senior Director for Advocacy and Well Being & School Ombudsperson (investigates complaints and works to resolve issues)
Cheryl Paul
412-624-9825; cheryl35@pitt.edu

School Level Graduate Organizations & Programs
PITT STRIVE (a program and community focused on supporting underrepresented PhD students)
https://www.engineering.pitt.edu/strive

Graduate Engineering Education Scholarship (GEES; MS Program)
https://www.engineering.pitt.edu/gees

Engineering Graduate Student Organization
https://experience.pitt.edu/egso/leadership-team/

Graduate Women in Engineering Network
https://twitter.com/GWENPittsburgh

International Engineering Student Organization
(currently undergoing registration as a formal organization)

Engineering Diversity Graduate Student Association
(currently not active)

School Level Facilities

If you notice incorrect or important missing information, please provide feedback.

Lactation Room: 403 Benedum Hall; Reclining Chair; Door looks from the inside; use is first come, first serve. For any concerns contact Danielle Ilchuk (dilchuk@pitt.edu)

- Please note that there are also rooms nearby in the University Club and Public Health (for more information see https://www.diversity.pitt.edu/diverse-populations/lactation-rooms)

Single Occupancy and Unisex Bathrooms:

- Benedum has 2 single occupancy bathrooms available for student use. They are both located on the G level, in the hallway around the corner from G24.

Department Level Contacts

Department Level Anonymous Reporting (This is a confidential survey that will generate an anonymous message, unless contact information is provided in the form, directly to our Department's Associate Chair of Culture and Community—Dr. Steven Abramowitch) https://pitt.co1.qualtrics.com/jfe/form/SV_1RgMpWsTIQchn38

Chair of the Department of Bioengineering
Sanjeev Shroff, sshroff@pitt.edu
412-624-9809
Office located in the Bioengineering Suite, 3rd Floor Benedum Hall

Associate Chair of Culture and Community
Steven Abramowitch, sdast9@pitt.edu
412-383-9618
Office 406 Benedum Hall, appointments can be made via the following link:
https://book.morgen.so/sdast965

BMES Chair of *Recruitment & Retention Chair*
Sophie Hines, soh37@pitt.edu

We recognize that this information is incomplete and may quickly become outdated. If there are changes that you are aware of that you would like to see included in this document on DEIA or language that you would like to see changed. Please email suggestions and comments to the Department's Associate Chair for Culture and Community, Steven Abramowitch sdast9@pitt.edu.

Other Mental Health Resources

Thrive @ Pitt
Becoming a student mental health champion

10. PROFESSIONAL DEVELOPMENT

Students should be aware that preparation for their successful career requires professional development skills that are beyond the core graduation requirements. Professional development is wide in breadth and every potential aspect cannot be captured in this document. Some common skills include job acquisition skills (resume/CV

formatting, interview skills), interpersonal skills (networking), communication skills (presentation, casual discussion), work skills, and management skills. Students are encouraged to take an inventory of their current skills, areas where they wish to build on current strengths, and areas where they wish to address deficiencies. These discussions would ideally occur with a student's advisor but could occur with other trusted individuals. A plan that helps students achieve the professional development skills needed for their career should be executed alongside their coursework and research plan (if applicable).

10.1. Available resources

Departmental resources are organized in a Canvas page ("Bioengineering Graduate Program Professional Development"). This page contains multimedia content (presentations, videos, worksheets), links and information to other valuable professional development resources (Swanson School of Engineering, NIH, etc.), and interactive Discussion Boards. Students will be invited to the Canvas page over email but need to accept the invitation. Students who are unable to access the page should contact the Associate Chair of Graduate Program Professional Development (see Key People section) if they do not have access. Students are welcome to suggest additional professional development events that would be beneficial to the bioengineering community. Other resources include:

Center for Integration of Research, Teaching, and Learning (CIRTL)
https://www.engineering.pitt.edu/subsites/centers/cirtl/

Office of Academic Career Development (https://www.oacd.health.pitt.edu/)

Office of Experiential Learning and Professional Engagement (ELPE)
(https://www.engineering.pitt.edu/coop)

Student organizations (ASB, BMES, EGSO, GWEN, GEES, IESO)

Student organization resource center (SORC)
(https://www.studentaffairs.pitt.edu/student-organization-resource-center)

SSoE Select (https://engineering-pitt-csm.symplicity.com/)

10.2. Role of advisor

For most students, their advisor will be a critical source of professional development advice. Students should discuss professional development needs on a regular basis (at least annually) to determine if they are on track to develop the required professional development skills by the time they graduate. Students may decide to assemble additional mentors within and outside of the department who can operate synergistically. For example, professional development content from the department may provide workshops and training, the ELPE may provide resume feedback and mock interviews, your advisor may provide input on professional development expectations in your field

and connections to experts in your primary field, and an external mentor may provide connections to another field of interest outside your advisor's field and a second opinion on expectations in the field. Students are welcome to consult with any faculty mentor to assist with the planning of professional career paths.