



GRADUATE STUDENT HANDBOOK 2017-2018

[HTTP://WWW.BME.CMU.EDU](http://www.bme.cmu.edu)

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INTRODUCTION

CARNEGIE MELLON UNIVERSITY STATEMENT OF ASSURANCE

Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state, or local laws or executive orders.

Inquiries concerning the application of and compliance with this statement should be directed to the vice president for campus affairs, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-2056.

Obtain general information about Carnegie Mellon University by calling 412-268-2000.

The Statement of Assurance can also be found on-line at: <http://www.cmu.edu/policies/documents/SoA.html>.

THE CARNEGIE MELLON CODE

Students at Carnegie Mellon, because they are members of an academic community dedicated to the achievement of excellence, are expected to meet the highest standards of personal, ethical and moral conduct possible.

These standards require personal integrity, a commitment to honesty without compromise, as well as truth without equivocation and a willingness to place the good of the community above the good of the self. Obligations once undertaken must be met, commitments kept.

As members of the Carnegie Mellon community, individuals are expected to uphold the standards of the community in addition to holding others accountable for said standards. It is rare that the life of a student in an academic community can be so private that it will not affect the community as a whole or that the above standards do not apply.

The discovery, advancement and communication of knowledge are not possible without a commitment to these standards. Creativity cannot exist without acknowledgment of the creativity of others. New knowledge cannot be developed without credit for prior knowledge. Without the ability to trust that these principles will be observed, an academic community cannot exist.

The commitment of its faculty, staff and students to these standards contributes to the high respect in which the Carnegie Mellon degree is held. Students must not destroy that respect by their failure to meet these standards. Students who cannot meet them should voluntarily withdraw from the university.

The Carnegie Mellon Code can also be found on-line at: <http://www.cmu.edu/student-affairs/theword/code.html>

DEPARTMENT CONTACTS

Department Head	Yu-li Wang	x8-4442	All issues
Associate Department Head	Conrad Zapanta	x8-9061	Undergraduate issues & course arrangements
GAC Chair	Newell Washburn	x8-2130	Graduate academic requirements & policies
Assistant to the Department Head	Karina Shevchenko	x8-6222	Keys and card access, seminar series
Business Manager	Keri Baker	x8-6668	Administrative supervision, human resources, and financial reporting

Associate Business Manager	Vanessa Calvin	x8-2580	Foreign scholar visa coordination; graduate student funding
Graduate Program Administrator	Maryia Rakach	x8-4707	Graduate admissions, record management, registration, advising, and general assistance
Sponsored Research Administrator	Jacob Stempky	X8-9950	Grant and contract management
Buyer	Michael Scampone	X8-8623	Purchase orders; expense reports; P-Card reconciliations
Collaborative Laboratory Manager	Misti West	X8-7169	Laboratory and equipment maintenance; technical and safety training; supply stock management
GBMES	Elaine Soohoo		Graduate student life and peer support

UNIVERSITY CONTACTS

Graduate Student Ombudsman	Suzie Laurich-McIntyre	x8-7970	Support for graduate students under complete confidentiality, to help clarify issues and suggest possible solutions to problems as well as direct students to the appropriate departmental and college processes and resources for handling conflicts.
Counseling & Psychological Services		x8-2922	Counseling of personal or academic concerns in a safe, confidential setting, including but not limited to: problems with family, friends, or school, concerns about the future, feelings of stress, low self-esteem, anxiety, depression, or loneliness.
Division of Student Affairs	Gina Casalegno	x8-2142	Initiatives related to academic integrity, multicultural programming, and graduate student support.
The HUB		x8-8186	Fee and tuition payment, ID cards, financial aid, transcripts and verifications, graduation and diplomas

ABBREVIATIONS AND DEFINITIONS

BME	Biomedical Engineering
CIT	College of Engineering – Formerly Carnegie Institute of Technology

CMU	Carnegie Mellon University
GAC	Graduate Affairs Committee
GBMES	The Graduate Biomedical Engineering Society
ICC	International Communication Center
MCS	Mellon College of Science
OIE	Office of International Education
PTC	Off-Campus Site at Pittsburgh Technology Center (until early 2016)
SCS	School of Computer Science
Semester	Fall, Spring, Summer
TA	Teaching Assistant
The HUB	Office for managing financial aid, payment, registration, and academic records

USEFUL LINKS

BME		Extension
BME Main Portal	http://www.bme.cmu.edu/	
Graduate Student Portal	http://www.bme.cmu.edu/gradsecure/index.html	
Graduate Program Application	https://app.applyyourself.com/?id=cmu-eng	
College of Engineering		
Graduate Student Resources	https://engineering.cmu.edu/education/academic-policies/graduate-policies/index.html	
Graduate Student Policies	https://engineering.cmu.edu/education/academic-policies/graduate-policies/degrees.html	
Ph.D. Student Policies	https://engineering.cmu.edu/education/academic-policies/graduate-policies/phd-qualifications.html	
Transfer Credit Request Form	https://engineering.cmu.edu/files/documents/graduate-students/grad_transfer_credit_request.pdf	
Carnegie Mellon University		
Academic Calendar	http://www.cmu.edu/hub/calendar.html	
Academic Integrity Policy	http://www.cmu.edu/academic-integrity/	
Campus Map	http://www.cmu.edu/about/visit/campus-map.shtml	
Campus Services	http://www.cmu.edu/faculty-staff/campus-services.shtml	
Career & Professional Development Center	http://www.cmu.edu/career/index.html	

Computer Store	http://www.cmu.edu/stores/computer/	x8-2636
Environmental Health & Safety	http://www.cmu.edu/ehs	
Health Insurance Policy	http://www.cmu.edu/health-services/student-insurance/index.html	
ITA Test	http://www.cmu.edu/icc/testing/ITA/	
Main Portal	http://www.cmu.edu	
Research Ethics & Responsible Conduct of Research	http://www.cmu.edu/research-compliance/responsible-conduct/training.html	
Schedule of Classes	https://enr-apps.as.cmu.edu/open/SOC/SOCServlet	
Shuttle & Escort Services	http://www.cmu.edu/police/shuttleandescort/	x8-6232
Student Information Online (SIO)	https://s3.as.cmu.edu/sio/index.html	
University Police	http://www.cmu.edu/police/	x8-2323

See additional listings in Section 4.2 and Chapter 5.

1. ACADEMIC POLICIES

The Department of Biomedical Engineering (BME) offers the following graduate degrees: Doctor of Philosophy (Ph.D.), Research-Option Master of Science (M.S.), Practicum-Option M.S., joint M.D./Ph.D. with the University of Pittsburgh School of Medicine, a dual M.S. degree in BME and Engineering & Technology Innovation Management (BME/E&TIM), and a dual M.S. degree in BME and Technology Ventures (BME/TV).

Ph.D. students, under the guidance of their academic advisor, are expected to make original scholarly contributions in their area of research and demonstrate the ability to perform at the highest scholarly level by international standards. Examples include having one or more articles past the acceptance stage of publication in a peer-reviewed journal and one or more presentations at a conference by the time of their dissertation defense.

Research-Option M.S. students are expected to demonstrate a strong potential for original research, by submitting a substantial final research report.

Practicum-Option and dual BME/ETIM M.S. students build up the depth and breadth of their knowledge in biomedical engineering through coursework at the graduate level and problem-solving.

The BME Department occasionally changes its program requirements in order to meet the evolving needs of the field. The Department applies a “grandfather” policy for each change, where students may complete their respective programs under the requirements in effect either at the time of their matriculation or at the time of their graduation. This policy does not apply to rule changes at the College or University level.

1.1. REGISTRATION

Students must register for at least 36 units per semester (Spring and Fall) in order to qualify as full-time, but no more than 60 units including research per semester.

Ph.D. students receiving full financial support administered through the BME Department must register for a minimum of 48 combined course and research units each semester.

International students who need to maintain legal visa status must register for a full-time 36-unit or more course load, unless otherwise arranged by the Office of International Education (OIE).

Students interested in auditing a course must fill out a [form](#) and register for the posted number of units for no grade or academic credit. Course audits require the approval of the course instructor while approval from advisor may also be necessary. Part-time students are responsible for the additional tuition incurred for auditing.

1.1.1. LEAVE OF ABSENCE AND WITHDRAWAL

Under extenuating circumstances (financial, academic, or personal), students may need to interrupt their studies. Students have two options at CMU; leave of absence (a temporary departure from the university with the intention of returning) or withdrawal (leaving the university with no intention of returning). The student must first consult the University Leave of Absence and Withdrawal policy and understand the procedures as posted on the HUB website.

When considering a leave of absence or withdrawal, students should contact the Graduate Program Administrator and their Academic Advisor to discuss arrangements, alternatives, and conditions that may be necessary for a smooth return to their studies at CMU.

1.1.2. STATUTE OF LIMITATIONS

Candidacy for the Ph.D. degree occurs after successful completion of the Ph.D. Qualifying Examination and remains in effect for a period of six calendar years. If, at the end of this six-year period, the student fails to complete the requirements

for the degree, he/she must reapply for admission to the Ph.D. program and will be judged competitively against other students applying during the same cycle. Petitions for extension of the six year limit may be made to the College of Engineering under extenuating circumstances; such as forced change of advisor, military service, or prolonged illness. The full policy can be found at the [College of Engineering Ph.D. Policy Site](#). A separate, stricter Statute of Limitations governs BME administered financial support (Section 3.1.2). In addition, the University stipulates that Ph.D. students must complete all the requirements no later than ten years from their original matriculation date in the Doctoral program.

M.S. students must complete all the requirements, as outlined in the [College of Engineering Policy on Statute of Limitations for Masters Degree Studies policy](#), no later than six years from their original matriculation date in the Master's program. Once this time-to-degree limit has lapsed, the student will need to reapply and gain acceptance to the program to resume work towards their M.S. degree. Under extraordinary circumstances, such as leave of absence, military or public service, family or parental leave, or temporary disability, the College of Engineering may extend the statute of limitations for a period commensurate with the duration of interruption. This extension requires a written petition and approval from the Department Head of BME, and approval from the Dean (or designate) of the College of Engineering.

1.1.3. ABD (ALL BUT DISSERTATION IN RESIDENCE, FOR PH.D. STUDENTS ONLY)

ABD (All But Dissertation) status applies to Ph.D. students who have completed all formal degree requirements (Section 2.1) except for the completion and approval of the Ph.D. Dissertation. An ABD student maintains student status and privileges, and is expected to remain actively engaged with the University. The ABD policy is governed by the College of Engineering and the University.

To enter the ABD status, the student must complete an [All But Dissertation Status Agreement](#) form available through the Graduate Program Administrator or on the HUB website, typically upon passing the Ph.D. Proposal Examination.

In most cases, ABD students work full-time on their research, and the ABD status affects neither the tuition nor the access to university resources including computing services. Students must continue to register for 42-990, Ph.D. Thesis Research each semester, including the semester of graduation, and will continue to be assessed at the full-time tuition rate. Under exceptional circumstances and through formal petition to the College of Engineering, the tuition for a full-time ABD student may be reduced to that corresponding to 5 units per semester provided that:

1. The student has demonstrated financial hardship, e.g. after expiration of the Statute of Limitations for Financial Support (Section 3.1.2).
2. The student does not receive any financial support (such as tuition, stipend, fees or health insurance) tied to activities that are integral to his/her doctoral program that is paid by or administered by the University. In addition, the student cannot receive financial compensation from the University such as research assistantship or paid teaching assistantship, except for hourly wages.
3. The student has accumulated at least three years of full-time student status.
4. The student is in good standing and is making progress towards the Ph.D. degree.
5. The student has no more than two semesters of required work; ABD with full-time status and 5 units of tuition will not be allowed for more than two semesters, where summer is considered a semester.

Full-time Ph.D. candidates on ABD status may pay no tuition for the final semester if all the graduation requirements are completed by the end of the first full month of the semester (see Section 2.5.6). However there is no waiver of campus fees. See the [College of Engineering ABD Policy](#) for additional tuition adjustment information.

1.1.4. ABS (ALL BUT DISSERTATION IN ABSENTIA, FOR PH.D. STUDENTS ONLY)

ABS status applies to a Ph.D. student who has left CMU with the intent of completing his/her Ph.D. Dissertation but is not actively engaged with the University and does not require CMU resources as outlined below. A student may request to be in ABS so long as the following three conditions apply:

1. The student has been enrolled as a full-time graduate student at CMU for at least one academic year. Part-time graduate enrollment may, at the Department's discretion, be counted pro-rata toward this requirement.
2. The student does not receive any financial support (such as tuition, stipend, fees or health insurance) paid by or administered by CMU that is tied to activities integral to his/her doctoral program. In addition, the student cannot receive financial compensation from CMU such as research assistantship or paid teaching assistantship, except for hourly wages.
3. The student does not require substantial use of CMU resources. Departmental certification of this condition shall be subject to guidelines established by the College. ABS students may continue to use the CMU library, to enter the buildings for consultation and to obtain University health insurance, but may use computing services only for departmental communications and Ph.D. Dissertation preparation. In cases when an ABS student needs to perform only a few studies to complete the thesis, the student should consult the Department Head to determine the appropriate way to proceed.

The student does not pay any tuition until the final semester for thesis submission, defense, and graduation, when the student is required to pay tuition on her/his own for 5 units. ABS cannot be used for maintaining a full-time student status, and therefore cannot be applied to international students who stay in the U.S. on student visa.

1.1.5. INTERNATIONAL STUDENTS MAINTAINING STATUS

International students who stay in the U.S. on student visa must maintain full-time registration status for the duration of their degree program. Any changes or adjustments to program requirements, including internships or co-ops, must be reported to the BME Graduate Program Administrator.

1.2. ADVISOR

Before or soon after entering the program, each Practicum-Option M.S. student will be assigned one or more official academic advisors. Unless otherwise arranged, Ph.D. and Research-Option M.S. students must take the initiative to find an advisor within the first month of matriculation. All primary advisors must have a core or courtesy faculty appointment in the BME Department, while adjunct members may serve as a co-advisor. The BME Department is committed to fostering optimal advisor/student interactions by establishing standards and timetables for equitable treatment of students.

1.2.1. ROLE OF THE ADVISOR

The Advisor provides guidance for both course planning and research projects. The role of the advisor is complex and can vary from student to student, but at least three characteristics can be identified: mentor, evaluator, and colleague.

For Practicum-Option students the advisor is responsible for assisting with course selection, for monitoring and evaluating the student's progress, and for working closely with the student toward a successful academic and professional outcome. The Graduate Program Administrator may serve part of these roles.

For Ph.D. and Research-Option MS students, the advisor is responsible for helping the student define a project and build the necessary foundation, for monitoring and evaluating the student's progress, and for working closely with the student toward successful research and professional outcome.

1.2.2. SEARCHING FOR A RESEARCH ADVISOR (FOR PH.D. AND RESEARCH-OPTION M.S. STUDENTS)

Advisor match can be pivotal for the success of Ph.D. or Research-Option M.S. education. A productive relationship can last well after graduation and turn into long-term collaboration and mutual-support. Therefore, the student must take a proactive, thoughtful approach when considering advisor options, through interactions with both the faculty and group members and taking into consideration mentoring style.

Ph.D. students may be assigned an advisor before matriculation or informed of several potential advisors. In the latter case the student should submit their preferences, treated confidentially, to the Graduate Program Administrator no later than the end of the fourth week of the first semester.

Research-Option M.S. students are provided with a list of potential advisors and are expected to contact those of matching interest proactively. The student should notify the Graduate Program Administrator of their preferences, treated confidentially, between the end of the fifth and seventh week of the first semester. Matching decision takes into consideration not only the preferences of the student and faculty, but also the capacity of advising and supporting resources. To avoid failure in matching, the student should identify multiple possible advisors. Research-Option M.S. students and faculty agreeing to accept the student must submit a signed [M.S. Research Agreement](#) to the Graduate Program Administrator as formal notification of their mutual commitment.

1.2.3. SWITCHING RESEARCH ADVISOR (FOR PH.D. AND RESEARCH-OPTION M.S. STUDENTS)

A student may wish to change their advisor under unusual circumstances. Such cases can seriously impact on the progress of research and should be discussed as soon as possible with the Department Head or the GAC Chair. Given the short timeframe of the Research-Option M.S. program, advisor switching may leave insufficient time to complete a new project and may compel the student to graduate in Practicum Option. If a Research-Option M.S. student is unable to find a new advisor, he/she will be required to switch to the Practicum-Option M.S. program.

For Ph.D. students, finding a new advisor often involves identifying a faculty member with not only matching interest but also available funding for providing the financial support. While the Department will make every effort to help, the student bears the responsibility of identifying a new advisor and the Department cannot guarantee the continuation of funding. If a new advisor cannot be identified by the end of the following semester, then the student must terminate the enrollment in the Ph.D. program with the possibility to move to the M.S. program. The student is not allowed to complete the Ph.D. program as a self-supported student.

If a new advisor is found, the student must discuss specific commitments with the current advisor during the transition, as mediated and monitored by the Department Head, and show a high level of professionalism and responsibility. Reasonable tasks may include finishing up experiments, writing up the work, archiving the data, training a new student, etc. For Direct-Entry Ph.D. students, every effort should be made to complete a Research-Option M.S degree with the current advisor under such circumstances.

An advisor may request a Ph.D. or Research-Option M.S. student who is not a good fit in the research group to switch to a different advisor. The Department and faculty make a strong effort to avoid such situation given its impact on both the education of the student and the research program of the faculty. For Ph.D. students, the original advisor has the responsibility to continue any existing financial support for, at most, one semester following the current semester, unless the student is showing an exceptionally poor performance. The Ph.D. student will have to leave the Department at the end of the following semester if he/she fails to find a new advisor.

1.3. SWITCHING BETWEEN GRADUATE PROGRAMS

1.3.1. SWITCHING FROM M.S. TO PH.D.

M.S. students who wish to continue with Ph.D. education in BME at CMU must apply for admission to the Ph.D. program according to the regular admissions policy, using the online application system. The student does not have to pay the application fee or retake standardized tests unless requested by the Department. Three letters of recommendation are required, preferably with at least two coming from the faculty of CMU. Acceptance into the program will depend on both qualifications of the student and the availability of financial support. If admitted, financial support for the student will typically begin the first day of the following semester unless otherwise arranged. Eligible courses taken at CMU may be

counted toward both the M.S. and Ph.D. degree, by applying the requirements of the Direct-Entry Ph.D. program as described in Section 2.1.5.

1.3.2. SWITCHING FROM PH.D. TO M.S.

Students in the Direct-Entry Ph.D. program are free to switch to the M.S. program at any time within the first year, possibly with the termination of financial support. Direct-Entry Ph.D. students who fail the Ph.D. Qualifying or Proposal Examination may switch to the M.S. program, as addressed in Sections 2.2.6 and 2.3.6. Students receiving BME-administered financial support will have the stipend stopped immediately and tuition support stopped the following semester.

1.3.3. SWITCHING BETWEEN M.S. OPTIONS

Research Option MS students may petition to switch to Practicum Option at any time using the [M.S. Option Switch](#) form. Once formalized, students will not be allowed to switch back to Research Option.

Switching from Practicum Option to Research Option MS Program requires two levels of approval. The student should first submit to the GAC the [M.S. Option Switch](#) form, articulating both the qualification for conducting research and the justification in relation to the career plan, within the first two weeks of entry. After receiving the initial GAC approval, the student should start contacting potential research advisors, and start the research as soon as a match is confirmed by the Department. Failure to match with an advisor by the end of the first semester terminates the consideration for the switch.

The second level of approval takes place at the end of the first semester, when GAC will review both the QPA for the first semester and research performance in consultation with the advisor to reach one of the following decisions, disapproval to switch to the Research Option, approval to switch to the Research Option, or deferral with a final decision reached no later than the end of summer. In the case of deferral, the final decision will be based on both the QPA and advisor's assessment of research progress, therefore the student should continue with the research unless otherwise advised by the advisor. In addition, the student should keep course selections compatible with Practicum Option requirements in case the switch is later denied. As long as the advisor agrees, denial does not necessarily preclude the student from continuing the research, but will preclude the graduation in Research Option.

Upon receiving the approval to switch to Research Option, the student may choose to stay in Practicum Option, or to request to switch back to the Practicum Option at a later time. However, no further request to switch options will be considered.

1.4. PERFORMANCE REVIEW

The GAC reviews the progress of Research-Option M.S. students at the end of the first and second semester to ensure that their coursework and research are on track. Students are required to submit a summary of research at the end of the first year with an outline of research plan for the second year. If a student is not meeting the expectations of the advisor/Department he/she will be switched to the Practicum-Option M.S. program at the start of the following semester.

The Department rigorously tracks the progress of Ph.D. students each semester and provides timely feedback, using a secure [Ph.D. Performance Review website](#) (also accessible from [Graduate Student Portal](#)). At the beginning of each semester excluding summer, students are required to update the information and upload a self-assessment, where the student is asked to comment on his/her general strengths and weaknesses, problems encountered, and plans for research or career development. A laundry list of things accomplished or to be accomplished is not acceptable.

A faculty meeting for Ph.D. Performance Review is held at the beginning of each semester to assess the progress of each student and discuss the self-assessments and responses drafted by the advisor. The discussion then leads to a letter designation (SP, USP, N-1, M2M; see below) as well as a finalized feedback letter to the student reflecting the consensus view of the faculty.

The outcome of Ph.D. Performance Review can impact departmental financial support. The overall assessment is designated as one of the following:

- **SP (satisfactory progress)** indicates that the faculty body is satisfied with the student's performance. The feedback letter may give specific pointers to help the student's career development.
- **USP (unsatisfactory progress)** indicates that the faculty body is concerned about some areas of the student's performance. The feedback letter will include specific concerns and expectations. In most cases, it is not difficult to convert the designation of USP to SP in the following semester given appropriate attention to the feedback.
- **N-1 (support not to be continued past the end of the following semester)** indicates that the faculty body is seriously concerned about the student's performance. The feedback letter will include specific milestones that the student must reach in order to receive a designation of SP in the following semester. Otherwise, the student's financial support is terminated at the end of the following semester and the student will be asked to leave the Department.
- **M2M (support not to be continued past the end of the month)** indicates that the faculty body is gravely concerned about the student's performance or conduct. The feedback letter will include specific milestones that the student must reach in order for the financial support to continue. The progress of the student will be monitored closely, and the decision to extend the support month-to-month is made by the advisor in consultation with the GAC and the Department Head. In the event that support is terminated, the student will be asked to leave the Department.

Should the student wish to formally respond to the feedback letter, he/she may do so in email to the GAC Chair within two weeks of receiving the feedback. The letter will be distributed to the BME faculty and a response by the Department Head will be sent to the student within two weeks.

1.5. ACADEMIC INTEGRITY

The BME Department takes strong actions, consistent with the policies of the [College of Engineering](#) and [Carnegie Mellon University](#), against any student who engages in cheating or plagiarism in courses or research. All students are required to complete the [How to Recognize Plagiarism](#) module within the first semester of study and submit the certificate to the Graduate Program Administrator. In addition, Research-Option M.S. and Ph.D. students are required to complete the online Responsible Conduct of Research training within the first semester, as described in Section 2.1.12.

1.5.1. PENALTIES FOR VIOLATING ACADEMIC INTEGRITY

In cases of suspected violations of academic integrity, the instructor informs the BME Department and may refer the case directly to the [Dean of Student Affairs](#). The student is barred from receiving any financial aid upon the first confirmed violation and may be placed on academic probation. In extreme cases where a first violation is particularly deplorable, a student may be expelled from CMU. Upon second violation, the student will be expelled from CMU.

1.5.2. APPEAL PROCESS FOR VIOLATIONS OF ACADEMIC INTEGRITY

A student may appeal a penalty against an academic integrity violation, including expulsion, if he/she deems the penalty as inappropriate and/or believes that improper procedure has been followed. The student may submit a written appeal within one week of the notification of penalty to the Department Head, the Dean of College of Engineering, or the University Provost.

When an appeal is made to the Provost, the Provost will determine the appropriate actions, which may include denying the appeal, remanding the case to the Department Head for further consideration, ordering a new or different penalty,

convening a Review Committee for additional investigation of facts and/or determination of sanctions. For details, see the [CMU Summary of Graduate Student Appeal and Grievance Procedure](#).

1.6. RESOLUTION OF GRIEVANCES

The policy on the resolution of grievances is set by the College of Engineering (see [the College of Engineering Graduate Student Policy site](#)). While the BME Department encourages graduate students to bring up any grievances with the advisor first, there are many alternative or complementary options including any faculty members of the BME Department, the Chair of GAC, the Department Head, or the College of Engineering Associate Dean for Graduate & Faculty Affairs. The student should apply their best judgment according to the circumstance. All such discussions with the faculty or staff will be treated as confidential at the request of the student.

Academic grievance may be filed formally with the Department Head or GAC Chair. If the issue cannot be resolved within the BME Department, the student may contact the College of Engineering Associate Dean for Graduate & Faculty Affairs and consider filing a formal appeal of academic actions with the College. In accordance with the [CMU policy](#), such grievances will ordinarily be heard and decided by the College of Engineering College Council. Written materials and findings of such appeal processes are considered confidential. If this process cannot reach a resolution, an appeal may be made to the Provost at the request of either the student or the College.

2. ACADEMIC REQUIREMENTS

Students must opt for letter grades for all formal courses to be counted towards a graduate degree, excluding research, practicum, 42-701 seminar, or milestones such as Ph.D. qualifying examination. Only courses that receive a grade of C or better may be counted toward the degree. In addition, these counted courses must show a Quality Point Average (QPA) of 3.0 or better for the student to qualify for any graduate degree in BME.

BME courses are designated with a 42-xxx course number. Courses that are not offered by BME Department but have been pre-approved to count towards BME degree requirements are listed in the online [Course Catalog](#). Students who are interested in taking a course that is not listed in the Course Catalog but is relevant to a professional career in biomedical engineering may petition the GAC by submitting the BME [Course Petition](#) form prior to the Course Add Deadline of the semester. Students may take at most one course per semester that is not biomedical in its primary content, whether or not the course is to be counted toward the BME degree. Biomedical primary content is to be determined based on course title and/or description, with input of the instructor as necessary. Sport, art, or recreational courses are excluded from this limit. Full-time students who have completed most of the program requirements and have units available are allowed to take up to two non-biomedical courses for the very last semester. Full-time students in BME/E&TIM and BME/TV dual Master Program are allowed to petition for up to two non-biomedical courses (relevant to a professional career in biomedical engineering) for each BME semester.

Except for the switching from BME M.S. to BME Ph.D. program (see Section 1.3.1), course(s) that has been counted toward a degree cannot be counted toward fulfilling course requirements for the BME degree, unless explicitly authorized for a particular program as set forth in the specified requirements for the program, or by the department head(s) of the primary department(s) of the graduate student.

2.1. DEGREE REQUIREMENTS

2.1.1. ACADEMIC REQUIREMENTS FOR THE RESEARCH-OPTION M.S. DEGREE

Students in the Research-Option M.S. program should expect to spend two academic years or equivalent in full-time study (21 calendar months, minimal 36 units per semester). The first year is predominately devoted to satisfying the course requirements and laying the groundwork for the research project; the summer and the second year is devoted primarily to research. A [Research-Option M.S. Completion Worksheet](#) is available at the [Graduate Student Portal](#) site to help with planning.

Research-Option M.S. program does not have a full-time residency requirement, such that the degree may be completed entirely on a part-time basis. Part-time MS enrollment is an option for special circumstances, such as students who would like to pursue an MS degree while maintaining external employment. Students must either apply directly to a separate part-time MS program or file a petition to move from the full-time to the part-time Program. Note that US immigration regulations do not allow Carnegie Mellon University to issue visa documents for the part-time MS program.

The following is a summary of requirements:

1. The student must satisfactorily complete a minimum of 96 units, out of which at least 72 units must be formal coursework in the general area of biomedical engineering. Up to 12 units of 42-790, Practicum in BME, may be counted as coursework if performed at a medical center with clinical exposure. No more than 24 units of the coursework may be advanced undergraduate level courses (300, 400 or 500 level).
2. Core course requirement – one course each of at least 9 units for three of the following areas:
 - Molecular/Cellular Biology
 - Physiology
 - Bioimaging/Bioinformatics

- Biomaterials
- Biomechanics

A [list](#) of courses that belong to each core area is available at the [Graduate Student Portal](#). A course may be counted toward at most one core area even if it is listed under multiple areas.

3. A maximum of one course per semester may be taken from outside CMU through cross registration, except for the last semester prior to graduation when all courses must be taken at CMU. **Prior approval** by the GAC is required for these courses to be counted toward the BME degree. Students should check with the HUB for rules and restrictions of cross registration and contact the Graduate Program Administrator well before the beginning of the semester.
4. Course selection must be approved by the Graduate Program Administrator, who may consult the GAC, to ensure that there is a clear theme in biomedical engineering, with possibly additional courses from other departments to supplement and enhance this theme. At least 36 units of the 72 units of formal coursework must be 42-xxx courses. In addition, at most one course that is not biomedical in its primary content may be taken per semester, whether or not the course is to be counted toward the BME degree. Biomedical primary content is to be determined based on course title and/or description, with input of the instructor as necessary. Sport, art, or recreational courses are excluded from this limit. Full-time students who have completed most of the program requirements and have units available are allowed to take up to two non-biomedical courses for the very last semester.
5. The student must attend biomedical engineering seminars and receive either a Passing grade for 42-701, or a letter grade of C or better for 42-801, for each semester. See Section 2.1.11.
6. The student must pass at least a total of 24 units of 42-890, M.S. Research (minimum of 12 units of 42-890 per semester or 36 units in summer semester). Students who failed 42-890 for any semester are disqualified for the Research-Option M.S. program but may petition GAC to switch to the Practicum-Option M.S. program. Unless the mentor is an adjunct faculty member of BME, 42-890 cannot be taken outside CMU.
7. The student must take the online training for Responsible Conduct of Research (see Section 2.1.12) and submit the certificate to the Graduate Program Administrator.
8. The student must register for 42-899, M.S. Research Final Report, during the final semester and submit an M.S. Research Final Report. The report must meet the approval of the advisor, a BME faculty reader (core, courtesy or adjunct), and the BME Department Head, and may be in one of the following formats: as a thesis following College of Engineering's thesis format, as a **submitted** journal manuscript of a similar substance with the student as the lead author, or as a **published or accepted** official institutional technical report of a similar substance with the student as the lead author. The report, in PDF format, should be sent to the Graduate Program Administrator, along with the signed [title page](#) and the [Research-Option M.S. Completion Worksheet](#) found on the [Graduate Student Portal](#), 5 days before the Final Grade Due date by 4 p.m. There is no requirement of public presentation or defense.
9. The student may take Extramural Practicum 42-792 during the summer upon approval of the advisor, BME Department, and the OIE for international students, for the purpose of gaining experience in real-world practice. The Practicum must be directly relevant to biomedical engineering. The [application](#) for 42-792 must be submitted well ahead of time through the Graduate Program Administrator. Students are expected to keep a daily log of activities during the internship and submit a report describing the accomplishment after completing the Practicum. The student is eligible to take 42-792 only if the Practicum does not jeopardize successful completion of M.S. Research Final Report.

2.1.2. ACADEMIC REQUIREMENTS FOR THE PRACTICUM-OPTION M.S. DEGREE

Students in the Practicum-Option M.S. degree should normally expect to spend one and half academic year (16 calendar months) in full-time graduate study, although a shorter period may be possible for some students including most CMU

students who entered the program under College of Engineering's [Integrated Master's/Bachelor's Degree Program](#). In either case, students must meet a minimal full-time residency requirement of one Fall or Spring semester. A [Practicum-Option M.S. Completion Worksheet](#) is available at the [Graduate Student Portal](#) site to help with planning.

The following is a summary of requirements:

1. The student must satisfactorily complete a minimum of 96 units, out of which at least 84 units must be formal coursework in the general area of biomedical engineering. No more than 27 units of the coursework may be advanced undergraduate level courses (300, 400 or 500 level).
2. Core course requirement – one course each of at least 9 units for three of the following areas:
 - Molecular/Cellular Biology
 - Physiology
 - Bioimaging/Bioinformatics
 - Biomaterials
 - Biomechanics

A [list](#) of courses that belong to each core area is available at the [Graduate Student Portal](#). A course may be counted toward at most one core area even if it is listed under multiple areas.

3. A maximum of one course per semester may be taken from outside CMU through cross registration, except for the last semester prior to graduation when all courses must be taken at CMU. Prior approval by the GAC is required for these courses to be counted toward the BME degree. Students should check with the HUB for rules and restrictions of cross registration and contact the Graduate Program Administrator well before the beginning of the semester.
4. Course selection must be approved by the Graduate Program Administrator, who may consult the GAC, to ensure that there is a clear theme in biomedical engineering, with possibly additional courses from other departments to supplement and enhance this theme. At least 42 units of the 84 units of formal coursework must be 42-xxx courses. In addition, for students entering in Fall 2017 and onward, at most one course that is not biomedical in its primary content may be taken per semester, whether or not the course is to be counted toward the BME degree. Biomedical primary content is to be determined based on course title and/or description, with input of the instructor as necessary. Sport, art, or recreational courses are excluded from this limit. Full-time students who complete most of the program requirements and have units available are allowed to take up to two non-biomedical courses for the very last semester. Full-time students in BME/E&TIM and BME/TV dual Master Program are allowed to petition for up to two non-biomedical courses (relevant to a professional career in biomedical engineering) for the each BME semester.
5. The student must attend biomedical engineering seminars and receive either a Passing grade for 42-701, or a letter grade of C or better for 42-801, for each semester. See Section 2.1.11.
6. The student must complete a Practicum in BME for at least 12 units. The Practicum requirement may be met by taking either the BME Practicum [42-790](#) during the academic year, or extramural summer internship 42-792 upon approval of the BME Department. The registration for extramural internship must be made well ahead of time through the Graduate Program Administrator.
7. The student may take Extramural Practicum 42-792 during the summer upon approval of the BME Department (and the OIE for international students), for the purpose of gaining experience in real-world practice. The Practicum must be directly relevant to biomedical engineering. The [application](#) for 42-792 must be submitted well ahead of time through the Graduate Program Administrator. Students are expected to keep a daily log of activities during the internship and submit a report describing the accomplishment after completing the Practicum.

8. CMU graduates who have done research with a BME faculty mentor previously may continue the research project upon agreement of the mentor, while registering for at least 12 units of 42-790. The student must notify the Graduate Program Administrator before starting the practicum.
9. Through a simple petition on the [Practicum-Option M.S. Completion Worksheet](#), the student may petition to count one of the following courses as Practicum: 42-612, 42-773, 16-725. The course may still count toward core requirement, if so specified in the Core Table. However, the units may be counted only once toward the total unit requirement.
10. Students who plan to graduate in 16 months may seek full-time summer research with a BME faculty advisor upon agreement of the faculty member. The student and advisor must both sign an [M.S. Research Agreement](#) form, and the student must finish an online course on [Responsible Conduct of Research](#) (RCR). Summer research should be registered as 42-890 Section R, tuition free. **Full-time** summer research may be petitioned to count as Practicum.
11. Students who are not in the BME/TV dual MS program may petition to count the course 49-850 “Grand Challenge Innovation” toward Practicum. In order to qualify, the project must be in biomedical engineering. The title of the project must be reported to the Graduate Program Administrator in the petition.

2.1.3. ACADEMIC REQUIREMENTS FOR THE DUAL MASTER BME/E&TIM DEGREE

Students in the BME/E&TIM dual Master program spend two years in full-time graduate study. Students who have successfully completed all requirements for the dual Master degree are awarded both degrees simultaneously at the end of the last semester. The dual program starts with the BME Practicum-Option M.S. Program for one (Fall) semester, followed by the [E&TIM program](#) for two (Spring/Fall) semesters with a summer internship in between. The student then returns to BME to finish the requirements for the BME Practicum-Option M.S. degree. Some qualified technical elective courses may be double-counted toward both degrees. Students should contact the E&TIM advisor for the details of its policy. The requirements for the BME M.S. degree are otherwise identical to those for Practicum-Option M.S. Students are expected to take BME courses only during BME semesters. Under special circumstances and with approval from the appropriate department, a student may be allowed take up to two non-BME courses (relevant to a professional career in biomedical engineering) during BME semester.

2.1.4. ACADEMIC REQUIREMENTS FOR THE DUAL MASTER BME/TV DEGREE

Students in the BME/TV dual Master Program spend two years in full-time graduate study. Students who have successfully completed all requirements for the dual Master degree are awarded both degrees simultaneously at the end of the last semester. The dual program starts with the BME Practicum-Option M.S. Program for two semesters (Fall and Spring semester), followed by the [MSTV program](#) for two semesters (Fall and Spring semester) at the CMU Silicon Valley campus. Some qualified technical elective courses may be double-counted toward both degree. Students should contact the MSTV advisor for the details of its policy. Students may petition to count 49-850 “Grand Challenge Innovation” toward Practicum requirement, and are strongly encouraged to work on a project directly relevant to biomedical engineering for this course. The requirements for the BME M.S. degree are otherwise identical to those for Practicum-Option M.S.

2.1.5. ACADEMIC REQUIREMENTS FOR THE DIRECT-ENTRY PH.D. DEGREE

Students who have not already obtained an M.S. degree in a BME-relevant field are accepted into the Direct-Entry Ph.D. program. Students should expect to spend four to five years full-time or equivalent to complete the Ph.D. requirements, with a required minimum of one-year full-time residency at CMU. The first year is usually devoted to taking courses and laying the foundation for thesis research. The coursework is generally completed during the second year, when the effort is shifted predominantly to thesis research through the remaining years. A [Direct-Entry Ph.D. Completion Worksheet](#) is available at the [Graduate Student Portal](#) to help with planning.

The following is a summary of requirements:

1. The student must satisfactorily complete a minimum of 192 units, out of which at least 84 units must be formal coursework in the general area of biomedical engineering. Up to 12 units of 42-790, Practicum in BME, may be counted as coursework if performed at a medical center with clinical exposure. No more than 21 units of the coursework may be advanced undergraduate level courses (300, 400, or 500 level).
2. Core course requirement – one course each of at least 9 units for three of the following areas:
 - Molecular/Cellular Biology
 - Physiology
 - Bioimaging/Bioinformatics
 - Biomaterials
 - Biomechanics

A [list](#) of courses that belong to each core area is available at the [Graduate Student Portal](#). A course may be counted toward at most one core area even if it is listed under multiple areas.

3. A maximum of one course per semester may be taken from outside CMU through cross registration, except for the last semester prior to graduation when all courses must be taken at CMU. **Prior approval** by the GAC is required for these courses to be counted toward the BME degree. Students should check with the HUB for rules and restrictions of cross registration and contact the Graduate Program Administrator well before the beginning of the semester.
4. Course selection must be approved by the research advisor and may be reviewed during performance review (Section 1.4) to ensure that there is a clear theme in biomedical engineering, with possibly additional courses from other departments to supplement and enhance this theme.
5. The student must attend biomedical engineering seminars and receive either a Passing grade for 42-701, or a letter grade of C or better for 42-801, for each semester. See Section 2.1.11.
6. The student must pass at least a total of 24 units of 42-990, Ph.D. Thesis Research, and a minimum of 12 units of 42-990 per semester. Students who failed 42-990 for any semester are terminated from the Ph.D. program.
7. The student must take the online training for Responsible Conduct of Research (see Section 2.1.12) and submit the certificate via the Graduate Review website.
8. The student must register and receive a Passing grade for three semesters of 42-996, Teaching Assistantship, to satisfy the teaching requirement (see Section 2.1.9).
9. The student must register and receive a Passing grade for 42-997, Ph.D. Qualifying Examination (see Section 2.2).
10. The student must register and receive a Passing grade for 42-998, Ph.D. Proposal Examination by the end of the **ninth** semester in residence (see Section 2.3).
11. The student must register and receive a Passing grade for 42-999, Ph.D. Thesis Defense, during the final semester. The policy governing the preparation of the Ph.D. Thesis and Thesis Defense is described in Section 2.4. Any publication based on the thesis research should be prepared in consultation with the advisor.

2.1.6. ACADEMIC REQUIREMENTS FOR THE ADVANCED-ENTRY PH.D. DEGREE

Students who have already obtained an M.S. degree or equivalent in a BME-relevant field may be accepted into the Advanced-Entry Ph.D. program. Students should expect to spend three to four years full-time or equivalent to complete the Ph.D. requirements, with a required minimum of one-year full-time residency at CMU. The first year is usually devoted to taking courses and starting early stages of thesis research. Starting the second year, the effort is devoted principally to thesis research. An [Advanced-Entry Ph.D. Completion Worksheet](#) is available at the [Graduate Student Portal](#) to help with planning.

Students are referred to the academic requirements for Direct-Entry Ph.D. degree, with the following differences.

1. The student must satisfactorily complete a minimum of 96 units, out of which at least 42 units must be formal coursework in the general area of biomedical engineering. Up to 12 units of 42-790, Practicum in BME, may be counted as coursework if performed at a medical center with clinical exposure. No more than 9 units of the coursework may be advanced undergraduate level courses (300, 400, or 500 level).
2. However, students who received an M.S. degree from the BME Department at CMU are required to complete at least 84 units of formal coursework, by applying the unit requirements for Direct-Entry Ph.D. degree and (double) counting eligible courses that have been counted toward M.S. requirements.
3. The student must register and receive a Passing grade for 42-998, Ph.D. Proposal Examination by the end of the **eighth** semester in residence (see Section 2.3).

2.1.7. ACADEMIC REQUIREMENTS FOR THE M.D.-PH.D. DEGREE

The BME Department participates in a combined M.D.-Ph.D. Program with the [University of Pittsburgh School of Medicine](#) to give selected medical students the opportunity to receive both a Doctor of Medicine (M.D.) from the University of Pittsburgh and a Ph.D. in Biomedical Engineering from CMU.

Students formally enter Ph.D. studies after completing their second year of medical school training at the University of Pittsburgh School of Medicine. The student may elect to begin his/her research at CMU during the summer before and/or after the first year, and after the second year of medical school, provided a qualified advisor agrees to supervise the research. The student may also choose to rotate through up to three different laboratories of potential interest at CMU or University of Pittsburgh during these summers to facilitate the selection of research groups.

Completion of the Ph.D. degree program is targeted at three to four years of full-time study. The requirements for the Ph.D. degree are identical to those for the Advanced-Entry Ph.D. program (see Section 2.1.5), except that there is no core area requirement although all courses must remain BME relevant. The student may discuss with his/her advisor to determine the most beneficial courses to take according to his/her background and research interests. After receiving the Ph.D. Degree, the student resumes his/her M.D. training, completing the last two years at the University of Pittsburgh School of Medicine.

2.1.8. WAIVER OF CORE AREAS

Students who are already proficient in one or more core areas may petition to have up to two core areas waived. The student must present to the GAC evidence of prior completion of a graduate level course in the core area, with a grade of B or better. A [Core Area Petition](#) form and supporting materials must be submitted to the Graduate Program Administrator before the Course Add Deadline. Retro-active petitions will not be considered.

Petition for core area waiver alone does not transfer the course units or reduce the total unit requirement. Instead the student gains the flexibility to apply the units intended for a core course to an elective course, which must remain relevant to biomedical engineering. If the units earned for the course(s) under petition have never been used to satisfy any prior degree, the student may petition to be both exempt from a core area(s) and to have the units counted towards graduate degree requirements thereby reducing the required number of units for graduation, as explained in the next Section.

2.1.9. TRANSFER OF COURSE CREDITS

Students may request to transfer credits of up to 24 units from an institution other than CMU for the fulfillment of graduate requirements, after receiving the approval from both the BME Department and the College of Engineering. The course(s) must be at the graduate level and the grade must be B or better. The student must submit the College of Engineering [Graduate Transfer Credit Request](#) form, together with a course syllabus, evidence that course is at a graduate level, official transcript, and documentation from the previous institution that the course has never been counted towards a degree. Student who wishes to use the transferred course to also meet a core requirement should also submit the [BME](#)

[Core Waiver Petition](#) form. The GAC will inform the student of its decision and forward the petition to the College of Engineering upon approval.

Students who have graduated from CMU may count one [pre-approved non-42-xxx graduate course](#) and eligible BME (42-xxx) course units if they have not been used for fulfilling previous degree requirements. The course(s) must be at the graduate level and the grade must be B or better. Students must have their degree-granting department(s) send a written notification to the Graduate Program Administrator confirming that these course units have not been counted previously towards their degree(s).

All transferred courses must be approved well in advance of graduation.

2.1.10. TEACHING ASSISTANT ASSIGNMENT AND TEACHING REQUIREMENT FOR PH.D. STUDENTS

Teaching Assistant (TA) works closely with the course instructor to provide help and advice to students, grade homework assignments and projects, supervise lab exercises, and occasionally deliver lectures. To be effective, a TA should be familiar with the course material including class notes and solutions of problem sets. The average workload of a TA is 5-6 hours per week. Additional time and effort may be required to audit the course if a TA is uncertain about his/her background in any part of the course.

All Ph.D. students must register and receive a Passing grade for three semesters of 42-996, Teaching Assistantship. Ph.D. students are expected to take TA assignments seriously even though they are not directly linked to a student's financial support. The units received from 42-996 are not counted toward Ph.D. unit requirement; however poor performance will be discussed during the Ph.D. Performance Review (see Section 1.4).

TA assignments are made by the Department Head and Associate Department Head and announced prior to each semester. A Ph.D. student may volunteer to serve as a TA for up to two additional semesters after fulfilling his/her three-semester requirement, with permission of his/her advisor and with possible financial compensation in addition to the stipend.

M.S. students may apply for a TA position, using an online form made available by the Graduate Program Administrator during the application period once before the Spring and once before the Fall semester. M.S. students are not guaranteed TA assignments, nor is TA required or counted for degree completion. M.S. students who work as a T.A will receive financial compensation, but should never register for 42-996, Teaching Assistantship. In addition, TA performed as a M.S. student cannot be counted toward the TA requirement for a Ph.D. degree, if the student is later accepted into the Ph.D. program of the BME Department.

BME Graduate students with teaching assignments must attend the orientation provided by Eberly center aligned with the semester they are teaching. Students need to register for individual session(s) based on the Teaching assignment on a day provided by Eberly center. Graduate Program Administrator will contact students with the details about the registration and session(s) advised to attend. Graduate students who previously experienced equivalent training via Eberly Center programs, are not required to attend sessions.

2.1.11. ITA TEST FOR NONNATIVE ENGLISH SPEAKERS

The Pennsylvania State Law, English Fluency in Higher Education Act, requires that all nonnative speakers of English pass a test before they can work as a TA. Upon arriving on campus, nonnative English speaking Ph.D. students must report to the [Intercultural Communication Center](#) to schedule a placement interview, which assesses the actions required before the student may qualify as a TA, followed by an official International Teaching Assistant (ITA) Test. The outcome of the test, as described at the [ICC website](#), determines the nature of tasks allowed as a TA (or grader) and any follow up training required while serving as a TA. Specific rules on who must take the ITA Test are also specified at the [ICC website](#).

Nonnative English speaking M.S. students interested in TA assignments should contact the Graduate Program Administrator, who will assess the prospect for receiving a TA assignment and arrange for the ITA Test as appropriate. Arrangement for the ITA Test may not take place before the student receives a TA assignment.

2.1.12. SEMINAR REQUIREMENT

BME graduate students are required to enroll in BME Seminar 42-701 or 42-801 and receive a Passing grade each Fall and Spring semester. Students registering for the 0-unit option 42-701 are expected to attend at least 10 seminars per semester. Part-time students should attend a proportional number. Students must submit notes after each seminar, which are used for recording the attendance and assigning a Passing/Not Passing grade.

Students enrolled in 42-701 may substitute a BME seminar with a BME-relevant seminar at CMU or another local institution such as the University of Pittsburgh. Students should still register for 42-701 even if they must substitute the seminars regularly due to recurring schedule conflicts. The date, title, speaker, and location of the seminar attended must be included at the beginning of the notes. Students attending fewer than 10 seminars in a semester will receive a grade of Incomplete until additional BME-relevant seminars are attended to reach 10. Seminars attended before the beginning of a semester cannot count, and extra seminars attended may not be carried forward.

Students registering for the 3-unit option 42-801 are expected to attend all the regular BME seminars as for a regular class, and to submit a written report after conducting a follow-up self-study, which is used for assigning a letter grade at the end of the semester. Substitution is allowed only under unexpected circumstances, and must receive prior approval of the instructors. Students with multiple absences may receive a grade below C, such that no unit may be counted toward degree requirements.

2.1.13. RESPONSIBLE CONDUCT OF RESEARCH REQUIREMENT

In compliance with the requirement of various granting agencies, the College of Engineering requires its Ph.D. and Research Option M.S. students to finish an online course on [Responsible Conduct of Research](#) (RCR). Each student must take at least one base-level module, which may be Physical Science RCR, Biomedical RCR, or RCR for Engineers. Additional modules may be required for students doing research on human subjects or laboratory animals. Advisor may be consulted on the appropriate module(s) to take. RCR training must be completed no later than the beginning of the second semester in residence. Upon the completion of the training, the electronic version of the certificate should be submitted to the Graduate Program Administrator or uploaded onto the [Performance Review site](#) for Ph.D. students.

2.2. PH.D. QUALIFYING EXAMINATION

The purpose of the Ph.D. Qualifying Examination is to assess a student's potential as an independent researcher, as well as his/her general communication skills and knowledge of biomedical engineering. Successfully passing the Qualifying Examination admits students to the candidacy of Ph.D. and qualifies students for subsequent stages of degree qualification. Students should register for 42-997, Ph.D. Qualifying Examination, only in the semester when they are taking the Ph.D. Qualifying Examination for the first time, and should not register for any retakes.

2.2.1. TIMETABLE

Both Direct-Entry and Advanced-Entry Ph.D. students are required to take the examination at the beginning of fourth semester of residence counting summer. Students who were initially admitted into BME's M.S. program before transferring to the Ph.D. program may request to take the examination at an earlier date. The examination is scheduled centrally by the Department to take place between the week before and the end of the second week of the Fall and Spring semester.

2.2.2. EXAMINATION COMMITTEE

The Ph.D. Qualifying Examination Committee consists of three BME core, courtesy, or adjunct faculty members as appointed by the GAC, with at least one being knowledgeable in the general area of examination topics. The advisor must participate in the examination as a silent observer. The advisor may send suggestions of committee membership to the GAC Chair for consideration. However the GAC is under no obligation to honor the recommendation.

2.2.3. WRITTEN DOCUMENT

The written document for the Ph.D. Qualifying Examination is based on the research performed since the student entered the Ph.D. program. An electronic version of the document must be submitted to the Graduate Program Administrator and all the committee members two weeks before classes begin. Printed documents should be delivered at committee member's request. The student may solicit no more than editorial comments from the advisor. The format for the document is as follows:

- A cover page with the title of the document, the student's name, the name of the student's advisor, and an abstract of 300 words or less.
- A maximum of ten pages, including tables and figures but not counting the cover page and bibliography, describing the work which the oral presentation is to be based on. The document should include an introduction of pertinent background, the methods and results of research performed, and a discussion that covers interpretation of the results in addition to future development and potential broad impact.
- A bibliography of unlimited number of pages. Citations should follow the format of the journal *Biomaterials*. Students should be prepared to explain to the examination committee why a certain paper is cited.
- Format specifics: letter-size paper, 1-inch margins on top, bottom, right and left, 12-point Times Roman font, double spacing with no more than 23 lines per page.

2.2.4. ORAL PRESENTATION AND EXAMINATION

The oral examination starts with a 30-minute presentation by the student, followed by up to 45 minutes of Q&A by the Committee. Questions for the examination must be relevant at least in a broad sense to the written document or oral presentation. The student should demonstrate a thorough understanding of the purpose and significance of the research, the fundamental principles involved in the research, the literature appropriate to the research, the meaning of the results, and the broad context of prior work in similar areas. The student should demonstrate complete understanding of the material included in the written document and should comfortably present the materials without reading from the slides or notes. The ability to communicate in written and oral formats will also be assessed.

This examination is not intended to evaluate a research proposal or a project in completion, but to gauge the student's understanding of basic issues and concepts relevant to any materials included in the written document or oral presentation, as well as the inquisitiveness and general proficiency in logical thinking relevant to the research. Thus, pertinent coursework, its extensions into the research realm, life/medical science issues applicable to the written document, are all appropriate question topics and thus study areas. The advisor and fellow graduate students may participate in the preparation practices.

2.2.5. OUTCOME OF THE EXAMINATION

Following the examination, the student is asked to leave during a brief committee discussion. Deliberation of the outcome of the examination does not take place immediately following the examination, but during a subsequent faculty meeting when the committee members present their observations and recommendations to all the faculty members for a consensus decision of Pass, Retake, or Fail.

The evaluation process requires each committee member to assign a score, on a scale of 1-5 where 1 represents Excellent and 5 Clear Fail, to each of the following aspects and to the overall performance.

- Student can express him/herself well in written form as demonstrated by written report
- Student can express him/herself well in oral form as demonstrated by oral presentation
- Student is poised under pressure as demonstrated by student's management of Q&A session
- Student clearly understands project
- Student clearly understands the relevant science & engineering background

- Student can set project in the context of what has been done by others
- Student is productive
- Student understands results/expected results
- Student can go beyond the surface level in explaining phenomena
- Student can see the path forward

The advisor may inform their advisees of the final decision after the faculty meeting. An official summary feedback prepared by the Chair of the Qualifying Examination Committee will be sent to the student. The grade for 42-997, Ph.D. Qualifying Examination, is entered as Passing (S or P) for students who receive a Pass, or Incomplete (I) for students who receive a Retake or Fail. Depending on the decision of the student to or not to retake the examination or the outcome of the retake, the grade of Incomplete is changed to either Passing (S or P) or Not Passing (N).

2.2.6. RECOURSE UPON FAILURE

A student is permitted to retake the examination within one semester if the initial examination receives a decision Retake or Fail, with the timing determined by the faculty. The student may revise the written document and oral presentation as appropriate for the retake, or elect to change the topic. Oral presentation for the retake may be shortened if it remains largely unchanged. In most cases there is no change in committee membership for the retake.

If the student is unsuccessful in the retake, he/she may be offered the option of pursuing a Research-Option M.S. degree with the consent of advisor. To facilitate this transition, tuition and stipend support as administered by the Department will continue, but possibly at a reduced level (see Section 1.3.2). If the student cannot complete all of the requirements for a terminal M.S. degree after up to one semester of provisional funding, he/she may continue the M.S. training with the consent of the advisor but without financial support. Alternatively, students who fail the retake may pursue the Practicum-Option M.S. degree, with the immediate termination of tuition support administered by the Department. The stipend ends the month after the student fails the retake. Any outstanding balance due the University may be deducted from the student's final stipend.

If a student does not wish to retake the examination, any tuition support administered by the Department ends immediately and the stipend ends the month after the student fails the examination. Any outstanding balance due the University may be deducted from the student's final stipend.

2.3. PH.D. PROPOSAL EXAMINATION

The Ph.D. Proposal Examination represents the second stage of qualification towards a Ph.D. degree. The student should regard the Ph.D. Proposal Examination as both a test of preparedness to complete the Ph.D. research and an opportunity to receive early input from the prospective Ph.D. Thesis Committee on the proposed research. Assessments include the knowledge necessary for conducting the research, a clear conception of the scope of the work, and familiarity with the methods involved. Students should register for 42-998, Ph.D. Proposal Examination, only in the semester when they plan to take the examination for the first time, and should not register for any retakes.

2.3.1. TIMETABLE

The Ph.D. Proposal Examination occurs when a student has completed around one third of the Ph.D. research, which amounts to approximately one chapter in the body of a typical Ph.D. thesis. It is the responsibility of the student and the advisor to ensure that the Proposal Examination take place at this strategic juncture. In all cases the examination must be PASSED before the end of the ninth semester for Direct-Entry students, or the end of the eighth semester for Advanced-Entry students. The student is advised to start scheduling the examination several months before the desired date, taking into account the possibility of a scheduling delay or retake in relation to the above deadline.

2.3.2. PH.D. PROPOSAL COMMITTEE

Students should consult the advisor to identify suitable members for the Ph.D. Proposal Committee, which typically also serves as the Ph.D. Thesis Committee. Unlike the Ph.D. Qualifying Examination Committee, the Ph.D. Proposal Committee is assembled by the student and advisor. The student must contact prospective members to seek their consent to serve on the committee. The Ph.D. Proposal Committee consists of:

1. Student's advisor, who serves as the chair of the committee, plus a minimum of two members from the BME core or courtesy faculty.
2. One member from outside the BME Department, who may be within or outside CMU. Adjunct faculty members may count as either departmental or outside members.

2.3.3. WRITTEN DOCUMENT

An electronic version of the proposal must be submitted to the Graduate Program Administrator and all the committee members two weeks before the Proposal Examination. Printed documents should be delivered at committee member's request. Discussions between the student and the advisor are allowed during the preparation of both the written document and oral presentation.

The written document for the Ph.D. Proposal Examination should define the thesis problem and include an outline for the plan of attack, which the student should be prepared to defend. While the outcomes of an investigation may be difficult to predict, the student should be aware of possible scenarios and contingencies, and address the necessary research alternatives. An organizational table outlining the time allotted to various facets of the problem is helpful. The document follows the format of the standard NIH R01 grant application:

- Thirteen pages is the upper limit for the proposal document including one page of Specific Aims and twelve pages for the research strategy (see below). Figures, tables and references do NOT count towards the 12-page limit, unlike the NIH format where only references are not counted.
- The document should be in Arial, Helvetica, Palatino Linotype, or Georgia typeface, with a black font color and a font size of 11 points or larger. A Symbol font may be used to insert Greek letters or special characters, following the same font size requirement. Type density, including punctuation marks and spaces, must be no more than 15 characters per inch. Type may be no more than six lines per inch. Use letter paper size (8 ½" x 11"), with at least one-half inch margins (top, bottom, left, and right) for all the pages. Use only a standard, single-column format for the text.
- Sections (adapted from NIH SF424 R&R/PHS 398 Version B):
 - A. Specific Aims: State concisely the goals of the proposed research and summarize the expected outcome(s), including the expected impact of the results on the research field(s) involved. List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop a new technology. Specific Aims are limited to one page.
 - B. Research Strategy: Organize the Research Strategy in the order of execution and following the instructions below. Start each section with the appropriate section heading – Significance, Innovation, Approach. Cite published experimental details in the Research Strategy section and provide the full reference in the Bibliography and References Cited section. Research Strategy is limited to twelve pages.
 - a) *Significance*
 - Explain the importance of the problem or the critical barrier to progress in the field that the proposed project addresses.
 - Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.

- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

b) Innovation

- Explain how the application challenges and seeks to shift current research or clinical practice paradigms.
- Describe any novel theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
- Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

c) Approach

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted.
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high-risk aspects of the proposed work.
- Point out any procedures, situations, or materials that may be hazardous to personnel, and precautions to be exercised.
- Discuss the preliminary studies and data pertinent to this project. Preliminary data can help to establish the likelihood of success of the proposed project.

2.3.4. ORAL PRESENTATION AND EXAMINATION

The student and advisor should establish a date and time for the examination and inform the Graduate Program Administrator, who may assist with the reservation of a conference room. The student should also inform the Graduate Program Administrator of the proposed thesis title and the committee membership, for the preparation a yellow signature card that the student should collect before the examination.

The examination consists of an open and a closed part. The open part starts with a 45-minute presentation by the student, based on the written document, followed by 15 minutes of Q&A with the audience. The closed part is reserved for up to 45 minutes of Q&A with the committee, followed by a committee-only deliberation. Unlike the Ph.D. Qualifying Examination, the advisor participates actively in the entire process. A decision is typically reached by the Committee without the involvement of the rest of the BME faculty, and is conveyed to the student immediately after the deliberation.

2.3.5. OUTCOME OF THE EXAMINATION

The outcome of the Ph.D. Proposal Examination is a Pass/Retake/Fail decision by the Committee. The grade for 42-998, Ph.D. Proposal Examination, is entered as Passing (S or P) for a Pass, or Incomplete (I) for a Retake or Fail. Depending on the outcome of the retake and/or the decision of the student to retake or not to retake the examination, the grade of Incomplete is then changed to either Passing (S or P) or Not Passing (N).

Students who pass the examination should promptly bring the following to the Graduate Program Administrator:

- The yellow signature card with committee members' signatures.
- A completed [ABD form](#).
- Updated Ph.D. Completion Worksheet (available at the [Graduate Student Portal](#) site).

2.3.6. RECOURSE UPON FAILURE

The Ph.D. Proposal Committee may reach a Fail decision if it perceives significant weaknesses in knowledge and/or a low probability for scholarly contributions in the proposed area.

- If the Ph.D. Proposal Committee reaches a decision of Retake, financial support administered by the Department may continue at the normal level subject to approval by the advisor, until the deadline for the completion of the Ph.D. Proposal Examination as specified in Section 2.3.1.
- If the Ph.D. Proposal Committee reaches a decision of Fail, the student must terminate the Ph.D. training. Financial support administered by the Department may continue at the discretion of the GAC but not beyond the semester of the Fail decision.
- Failure to take or retake the Ph.D. Proposal Examination by the deadline is designated as a Fail. The student may petition the GAC under unusual circumstances such as serious illness.
- Students who fail the Ph.D. Proposal Examination may receive a Research-Option M.S. degree if he/she has fulfilled all the requirements by the end of the semester of the Fail decision. No extension is allowed.

2.4. PH.D. THESIS ASSESSMENT MEETING

The student should keep the Ph.D. Proposal/Thesis Committee abreast of the development after passing the Ph.D. Proposal Examination, soliciting periodic committee meetings in consultation with the advisor. At the minimum, one meeting, referred as the Thesis Assessment Meeting, must be scheduled with the Ph.D. Thesis Committee within 6 months of the intended defense date, to review the progress, seek input on the completion of research, and set a timeframe for the thesis defense. The student is responsible for coordinating the Thesis Assessment Meeting. The meeting may follow any format deemed productive for evaluating the progress. The meeting should lead to a consensus on the timeframe for thesis defense and any additional research to be completed beforehand.

Additional meeting(s) is required if this timeframe is determined as more than 6 months away. The student must file a report, using a posted [form](#), after the meeting if the timeframe for thesis defense is confirmed as within 6 months. A limited grace period may be granted upon petition to the GAC if thesis defense cannot take place within 6 months, e.g. due to scheduling difficulties. Otherwise a new meeting must be organized.

Consistent with the grievance policy (Section 1.6), students may contact the Department Head or the GAC Chair if they experience unusual obstacles in arranging the Thesis Assessment Meeting, or if the requests from the meeting appear unreasonable. The student may request that a GAC representative be present at the meeting as an observer.

2.5. PH.D. DISSERTATION AND THESIS DEFENSE

The Ph.D. Dissertation is the capstone of the Ph.D. research experience and a key requirement for the Ph.D. degree. Students should register for 42-999, Ph.D. Thesis Defense, only in the semester when they are taking the defense for the first time. Since it is an official record of work and achievements, there are special College of Engineering guidelines for its preparation and approval as described below.

The Ph.D. Dissertation must embody the results of extensive research, be an original contribution to knowledge, and include materials worthy of publication. It should demonstrate the candidate's ability to conduct an independent investigation, to logically interpret facts and phenomena revealed by the research, and to abstract principles upon which predictions and/or further developments can be made.

2.5.1. TIMETABLE

The time limit for the Ph.D. Thesis Defense is defined in Section 1.1.2, while the time limit for the financial support administered by the Department is governed by the separate Statute of Limitations for Financial Support (see Section

3.1.2). The student is encouraged to contact members of the Ph.D. Thesis Committee, to set the date of the Ph.D. Thesis Defense well in advance of the desired date and settle on a block of three hours.

2.5.2. PH.D. THESIS COMMITTEE

In most cases, the Ph.D. Thesis Committee is the same as the Ph.D. Proposal Committee (Section 2.3.2). Changes in membership are allowed with the approval of the advisor, but must remain compliant with the guidelines for the Ph.D. Proposal Committee.

2.5.3. PH.D. DISSERTATION

The standards for the Ph.D. Dissertation, including the format for the title page, are set by the College of Engineering and described at the [College of Engineering Ph.D. policies site](#). Students who have been supported by an external fellowship or research grant must acknowledge the support and include the grant number(s) in the Acknowledgements section. In case of self-funding it should be stated as well. A copyright page should be as the second page that has "copyright (c) 20XX, YOUR NAME" (where 20XX is the year of graduation) on the page. An electronic version of the Ph.D. Dissertation must be submitted to all the committee members at least two weeks before the Ph.D. Thesis Defense. Printed document should be delivered upon the request of committee members.

2.5.4. PH.D. THESIS DEFENSE

The Ph.D. Thesis Defense is the opportunity for the student to highlight his/her accomplishments in an open forum and to address questions from the Ph.D. Thesis Committee and the public. The presentation should state the motivation of the research, justify the conclusions with the results, and put the accomplishments in the broad context of biomedical engineering. The student must demonstrate that the accomplishments are original and meet international standards of excellence.

All committee members must participate in the Ph.D. Thesis Defense and at most one member may participate via teleconferencing. The student should reserve an appropriate room with the help of the Graduate Program Administrator, and provide the Graduate Program Administrator with a title and abstract for the Dissertation and names of committee members at least two weeks prior to the Thesis Defense. Any other materials required for the Ph.D. Thesis Defense must be coordinated beforehand with the Graduate Program Administrator. Food or drink may be provided as appropriate by the student.

The Graduate Program Administrator will prepare and distribute an announcement to the CMU community. The student should obtain a yellow signature card from the Graduate Program Administrator before the Ph.D. Thesis Defense for collecting committee signatures upon successful completion of the Defense.

The Ph.D. Thesis Defense has two parts. The first part is a 45-minute presentation by the student, followed by a Q&A session with the audience and committee, which may last for up to two hours. Both parts of the examination are open to the public. The committee then conducts a closed deliberation on the outcome. The student will be informed of the decision immediately afterwards.

2.5.5. RECOURSE UPON FAILURE OF PH.D. THESIS DEFENSE

Failure of the Ph.D. Thesis Defense is dealt with by the GAC on a case-by-case basis.

2.5.6. FINAL PREPARATION OF THE DISSERTATION

The following table shows the due dates for the submission of Ph.D. Dissertation to the Ph.D. Thesis Committee, the BME departmental Office, and the College.

Semester	Initial Document to the Thesis Committee	Final Document to the BME Office	College of Engineering Deadline, for Graduation in the Current Semester	College of Engineering Deadline, for Graduation in the Following Semester without Tuition
Fall	At least two weeks prior to the Ph.D. Thesis Defense	At least one week before the College of Engineering Deadline, but no more than two weeks after the defense.	Final Grades Due date	End of January
Spring			10 days before the final Grades Due date	NA
Summer			Final Grades Due date	End of September

Submission to ProQuest and Research Showcase is required for all the students submitting a dissertation. Student should go to the [ProQuest ETD webpage](#), select the orange “Sign up and get started today!” button (middle of the screen), search for *Carnegie Mellon University College of Engineering*, and fill out the required login information. The site will then issue an email with the credentials for entry into the site. Fill out the thesis information after entering the received credentials into the ProQuest ETD webpage. Students will be offered the option to allow Campus Access only for Research Showcase.

The format of the finalized dissertation including the signature, title, and abstract pages must follow exactly the [College of Engineering Dissertation Standards](#). The student should collect the signature(s) of the advisor for the signature pages before submitting the PDF file of the dissertation, the signature pages, the abstract pages, and the title pages to the Graduate Program Administrator, who will collect the signatures of the Department Head and the Dean on the signature page for submission to the University. See Section 2.5.7. Students are also required to complete an online [Survey of Earned Doctorates](#). See Section 2.5.7.

Upon request only, BME Department will provide the student and advisor(s) each with one bound hardcopy of the dissertation free of charge. Additional copies may be ordered at the cost of the student or advisor. It is the responsibility of the student to inform the Graduate Program Administrator of the number of bound hardcopies desired. These copies may follow an alternative format, with a PDF file provided by the student. Copies of bound dissertation will be mailed to the address provided by the student.

If the submission of Ph.D. Dissertation is not completed in time for the current semester, the student must register for the following semester. Tuition charge will be credited in full if the student is on official ABD status and if the Ph.D. Dissertation is submitted to College of Engineering near the beginning of the following semester, as specified in the table above.

Students returning from ABS must register for at least five units for the semester of graduation. International students should consult the Graduate Program Administrator and/or the Office of International Education to ensure the maintenance of a legal visa status.

2.5.7. PH.D. DISSERTATION PREPARATION AND SUBMISSION CHECKLIST

- Make sure to register for 42-999 Ph.D. Thesis Defense.
- Send Ph.D. Dissertation to members of the Ph.D. Thesis Committee at least 2 weeks prior to the examination.
- Email the Graduate Program Administrator the title and abstract of the Ph.D. Dissertation, the names of the Ph.D. Thesis Committee members, and the time and date of the Ph.D. Thesis Defense at least 2 weeks prior to the examination.
- Obtain the yellow signature card from the Graduate Program Administrator before the Ph.D. Thesis Defense. Collect the signatures after the examination if the Thesis Defense is successful.

- Complete any revisions as recommended by the Ph.D. Thesis Committee. Ensure the dissertation is compliant with the [College of Engineering Dissertation Standards](#). All dissertations must include an Acknowledgments section, which must describe membership of the Thesis Committee and source(s) of support for the research, even if it is self-support.
- Have the advisor sign one copy of the [signature page](#).
- Complete the [Survey of Earned Doctorates](#) and retain completion confirmation
- Send the following to the Graduate Program Administrator:
 - A digital copy of the finalized dissertation as a single PDF file, via email or in a memory device
 - A digital copy of the title page
 - A digital copy of the abstract
 - One hardcopy of the signature page, with the original signature of the advisor(s)
 - The yellow signature card signed by members of the Ph.D. Thesis Committee
 - Number of copies of bound dissertation to be ordered
 - Payment as applicable, for additional bound dissertation
 - The address for shipping bound dissertation
 - Confirmation of the completion of [Survey of Earned Doctorates](#)

2.6. CHECKOUT PROCEDURE

Before leaving CMU, the student should:

- Follow the [Departure Procedures](#) posted by [Environmental Health & Safety](#) if the student was involved in the use of hazardous materials.
- Leave forwarding address, which may be home or work address, and name of the employer, for the Graduate Program Administrator. Ph.D. students may place the information on the yellow signature card.
- Return the keys and the CMU ID to the Graduate Program Administrator.
- Check with [Student Health Services](#) regarding arrangements upon graduation.
- Make sure any outstanding balance is cleared through [SIO](#); the degree will be put on hold until this is done.
- Log onto the Commencement website through [SIO](#) and check for preferred name and address information – this will determine where the diploma is sent and what the name will look like on the diploma.
- Complete the survey sent by [Career & Professional Development Center](#).

3. FINANCIAL POLICIES

3.1. FINANCIAL SUPPORT (FOR STUDENTS RECEIVING FINANCIAL SUPPORT ONLY)

All Ph.D. students receive full tuition support with a living stipend through the BME Department or external funding agencies. Students are guaranteed continued support, subject to successful progress evaluated each semester (see Section 1.4). This financial support is typically terminated at the end of the month when the student successfully defends his/her Ph.D. thesis. Ph.D. students with externally administered financial support may receive partial support from the Department. Some M.S. students may receive partial financial support.

3.1.1. SETTING UP TO RECEIVE FINANCIAL SUPPORT

Students receiving financial support will have a position set up in the university's Workday human resources system and will receive a checklist of onboarding tasks from the [CMUWorks Service Center](#). These tasks must be completed promptly in order to begin receiving payments. One critical onboarding task is the completion of the Form I-9, which verifies an individual's eligibility to be employed by the university. Section 1 of Form I-9 should be completed online with [Workday](#) before the starting date. Students must then bring original documents that demonstrate employment eligibility to visit the CMUWorks Service Center located at 4516 Henry Street, Pittsburgh, PA 15213, Monday-Friday, 8:30 a.m. - 4:30 p.m., to allow a Service Center team member to complete the Section 2 of Form I-9 as soon as possible. More detailed information for new students can be found at [New Students](#) page of the website for CMUWorks.

A critical task for international students is to obtain a U.S. Social Security Number (SSN). Students without a SSN should contact the Graduate Program Administrator, who will help with the application process.

Department-administered financial support for Ph.D. students is provided in the form of a stipend payment, distributed on a semi-monthly payment schedule. Partial financial support in the form of Teaching Assistantships for M.S. students is paid as compensation for services, also on a semi-monthly payment schedule. Other forms of partial support may be posted directly to the student's account on a semester basis. [Workday](#) may be used for setting up a bank account for receiving the payment. It is also crucial for students to keep their address information up-to-date in [SIO](#), because the data feed into the Workday system for managing the payment.

3.1.2. STATUTE OF LIMITATIONS FOR FINANCIAL SUPPORT (FOR PH.D. STUDENTS ONLY)

In addition to the Statute of Limitations for meeting degree requirements (see Section 1.1.2), BME has a separate policy to govern the maximal period for a Ph.D. student to receive financial support. The statute of limitations for financial support for Direct-entry Ph.D. students is fourteen (14) semesters of full-time residence with summers counting as semesters (equivalent to one semester short of 5 calendar years). The statute of limitations for financial support for Advanced-Entry Ph.D. students is twelve (12) semesters of full-time residence with summers counting as semesters (equivalent to 4 calendar years). In all cases, continuation of financial support is dependent upon satisfactory progress, evaluated through the Ph.D. Performance Review process (Section 1.4).

It is recognized that the time required to complete a PhD project can be variable and difficult to predict. Thus, the statute of limitations is established to encourage students and their advisors to progress efficiently through the Ph.D. program, rather than to set a prescribed amount time to complete the PhD education. Students and advisors must balance the period of Ph.D. education against the expectation to produce a complete and high-quality dissertation—as a significant contribution to the field. GAC readily accepts reasonable justifications for additional time required beyond the periods specified above.

At least two weeks before the expiration of the Statute of Limitations for financial support, the student and advisor must jointly submit the [Application for Financial Support Beyond Statute of Limitations](#) to the GAC to justify why additional funds should be provided. If approved, funding will be provided one semester at a time such that the student must submit

a new petition each semester for further support. Students who lose financial support may petition for reduced tuition (Section 1.1.3) or finishing the degree in absentia (Section 1.1.4).

3.2. PAYMENT OF TUITION AND HEALTH INSURANCE

Tuition and required fees are charged to student accounts before the start of each semester. Students do not pay summer tuition for research/practicum courses such as 42-792, 42-890, 42-990, and various 0-unit graduate milestones. Other courses taken during the summer will invoke tuition.

For Ph.D. students under departmental support, automated semi-monthly payments are made by the department toward the tuition and Technology Fee, which decrease the balance incrementally over the course of the academic year. Any remaining balance on the student account reflects unpaid health insurance and other incidental charges such as library fines and health services visits, all of which are the responsibility of the student to settle with The HUB. Failure to do so will lead to enrollment status problems, possibly keeping the student from registering for courses. Therefore, supported students should routinely review their student accounts and contact the BME Business Manager promptly to resolve any discrepancies.

CMU requires all graduate students to enroll in CMU's health insurance program. An insurance waiver must be filed if the student is covered as a dependent elsewhere. The enrollment year for health insurance runs from August 1st through the following July 31st. Full-time students who do not file an insurance waiver or enroll for a specific plan are automatically charged for an Individual plan. The premiums for various options of health, dental, and vision insurance, together with details of coverage, are listed at the CMU [Health Insurance site](#).

3.3. POLICIES ON EMPLOYMENT, FELLOWSHIPS, INTERNSHIPS AND VACATIONS

3.3.1. POLICY ON EMPLOYMENT OUTSIDE THE DEPARTMENT

Full-time Ph.D. and Research-Option M.S. students are expected to devote full effort to their graduate studies, since coursework and research projects are planned to completely occupy their time. They are therefore requested to avoid outside employment. Practicum-Option M.S. students who are not receiving any financial support from the BME Department may accept employment within or outside of the CMU community without permission.

In exceptional cases, there may be outside consulting or employment opportunities that provide helpful experience complementary to graduate training, in addition to financial remuneration. Before assuming such commitments, including those within CMU, Ph.D. and Research-Option M.S. students must seek prior approval from both their academic advisor and the Department Head. In addition, all graduate students who receive BME Department-administered financial support including Teaching Assistantship must obtain approval from the Department Head. The Department may adjust the amount of financial support if the employment is deemed as affecting the student's departmental commitment.

3.3.2. POLICY ON EXTERNAL FELLOWSHIPS

A student receiving any kind of fellowship that is not administered through the BME Department must notify the Department of such support through the Graduate Program Administrator. The Department may make appropriate adjustments to the departmental financial support to maintain equitable treatment of students. This does not apply to financial awards provided by family or prior investments.

3.3.3. POLICY ON INTERNSHIPS

Internships often provide students with unique training and employment opportunities. Research-Option M.S. students are permitted to accept paid or unpaid internships during summer months with the advisor's permission. Ph.D. students are permitted to accept paid or unpaid internship opportunities during either summer months or academic year, with the

permission of advisor and GAC with a petition sent through the Graduate Program Administrator. After receiving the permission and finalizing the arrangement, the Ph.D. student should inform the Graduate Program Administrator of the position and any financial support, so that departmental financial support may be adjusted as necessary. International students must consult with OIE and complete appropriate paperwork to maintain legal visa status. Students should register for 42-792, Extramural Practicum, before participating in an internship.

3.3.4. POLICY ON VACATION TIME

Students receiving full financial support through the BME Department are expected to continue with their research during academic breaks, including summer months, with the exception of official University holidays. Such support does not include paid time off for personal business or vacations. Students who intend to take a vacation for up to two weeks must seek prior approval from the advisor and possibly make up the work. Students wishing to take longer periods of personal time off must do so without receiving financial support and must seek prior approval from their advisor at least four weeks prior to the planned departure except for emergencies. The student must then inform the Graduate Program Administrator, who will coordinate an appropriate adjustment of the stipend. International students must consult with OIE before planning any extended vacation to ensure legal visa status and/or re-entry into the U.S.

4. FACILITIES, SERVICES AND SAFETY PROCEDURES

4.1. BME DEPARTMENT FACILITIES AND SERVICES

4.1.1. EQUIPMENT AND SUPPLIES

The BME Department is open from 9:00 a.m. to 4:00 p.m., Monday through Friday during the academic year, to assist students. During these hours copiers in the office may be used by graduate students for limited research or teaching purposes. Personal or high-volume copying/printing may be done using [Andrew Printing](#), at [University Copy Centers](#), or at the [Tartan Ink Center](#) in the Cohon University Center.

Office supplies are not provided for student use. Supplies necessary for the student's research should be either provided by the advisor or the student. Most items may be found at the [University Store](#) or [Computer Store](#) located in the Cohon University Center.

4.1.2. STUDENT DESK SPACE

Desk space is guaranteed to full-time Ph.D. graduate students. The Department also makes an effort to accommodate the desk needs of Research-Option M.S. students. When receiving a key to the office, the student should not, under any circumstances, pass on or lend the keys to anyone else including students in the same group. The student is responsible for the keys issued and a record is kept in the student's file until all keys are returned. At the termination of the studies, the student should return all keys to the Graduate Program Administrator or the appropriate facilities manager.

Since only the most basic janitorial services are provided in most buildings, students receiving desk space are responsible for keeping the space in good order by performing housekeeping chores as needed. The Department may revoke desk assignment upon persistent negligence. Tasks related to building facilities may be performed by maintenance crew only, and non-emergency maintenance requests should be managed through the advisor. For an emergency repair after hours, students may call the Service Response Center directly at x8-2910 or Security at x8-2323. The Service Response Center manages emergency requests only.

4.1.3. PHONE AND MAIL

Campus calls may be made by dialing 8 + the 4-digit extension (denoted x8-XXXX). Students should coordinate with the advisor for external business calls, which may be made by dialing 9 followed by the full telephone number.

There are separate boxes in the departmental office for outgoing campus mail and outgoing stamped mail. The student is responsible for the postage for personal mail. Mail is delivered and picked up at the departmental office during weekdays before 10 a.m. Deliveries of courier services such as UPS may arrive anytime during weekdays. The Department or building staff will notify students for the arrival of packages, which should be picked up immediately. The packing slip should be sent to the Administrative Assistant if it is to be charged to the Department. To send packages for business, the student should make arrangements with the advisor and designated Administrative Assistant.

For postal service of personal matters, there is a [U.S. Post Service](#) branch on the lower level of the Cohon University Center.

4.1.4. TRAVEL

Students planning to travel for departmental business, with the advisor's consent, may make travel arrangements through the departmental Buyer and charge the costs to the Department. Upon completion of the trip, the student must promptly contact the designated BME Administrative Assistant to file the necessary report.

4.2. CAMPUS FACILITIES AND SERVICES

4.2.1. ID CARDS

<http://www.cmu.edu/idplus/idcards/index.html> (x8-5224)

Student IDs are necessary for many university services including the use of athletic facilities, the purchase of meal plans, the admission to special events, etc. Courtesy cards are available for spouses for a fee.

4.2.2. COMPUTER SERVICES

<http://www.cmu.edu/computing/> (x8-4357)

Each student is assigned an Andrew account upon matriculation from CMU's computing services. The Andrew account and password are used for email, Internet access, and logging on to many university computers. Students are strongly urged to protect the security of their Andrew account.

4.2.3. DINING SERVICES

<http://www.cmu.edu/dining> (x8-8090)

A dining plan can be purchased through CMU by accessing [CMU Dining Services](#). Some of the locations include: The Cohon University Center, Resnik Hall, food carts scattered around campus, including Wean Hall, Newell-Simon Hall, GSIA, and the Mellon Institute. There are also vending machines for snacks and drinks in various buildings across the campus.

4.2.4. LIBRARIES

<http://www.library.cmu.edu/> (x8-2444)

Students are invited to use the collections in the Roger Sorrells Engineering & Science Library, Mellon Institute Library and Hunt Library. The library website lists information on online journals and provides service for interlibrary loans. Circulating material may be borrowed by presenting a valid CMU ID card. Members of CMU also have access to the University of Pittsburgh libraries. Online journals from the University of Pittsburgh may be accessed by requesting a one-day login and password at the Hillman Library.

4.2.5. ATHLETIC FACILITIES

<http://athletics.cmu.edu/landing/index> (x8-8551)

Students are welcome to use the athletic and recreational facilities in the Cohon University Center, including the swimming pool, handball courts, weight room, golf room and main gym, as well as the adjacent tennis courts. These facilities may be used during scheduled periods when they are not in use for instructional purposes. A student may be asked to show a CMU ID card for obtaining a permit. There is a charge for use of some facilities.

4.2.6. COUNSELING & PSYCHOLOGICAL SERVICES

<http://www.studentaffairs.cmu.edu/counseling/> (x8-2922)

Counseling & Psychological Services (CaPS) affords the opportunity for students to talk privately about issues that are significant for them in a safe, confidential setting. Students sometimes feel confused about why they are feeling upset or about how to deal with an emotional situation. An initial consultation with a CAPS therapist may clarify the options and provide a recommendation to the appropriate mental health resource at CMU or in the larger Pittsburgh community. CaPS services are provided at no cost. There are, however, limits on the number of sessions. Follow-up psychiatric services and off-campus referrals for longer term therapy are at the student's expense. Appointments can be made in person or by telephone.

4.2.7. HEALTH SERVICES

<http://www.cmu.edu/HealthServices/> (x8-2157)

University Health Services (UHS) is staffed by physicians, advanced practice clinicians, and registered nurses who provide general medical care, immunizations, allergy injections, first aid, gynecological care and contraception, as well as on-site pharmaceuticals. There is a small visit fee to see the physicians and advanced practice clinicians; nurse visits are free of charge. Fees for prescription medications, laboratory tests, diagnostic procedures and referral to the emergency room or specialists are the student's responsibility. UHS also has a registered dietician and health promotion specialist on staff to assist students addressing nutrition, drug and alcohol and other healthy lifestyle issues. In addition to providing direct health care, UHS administers the Student Health Insurance Program. The Student Health insurance plan offers a high level of coverage in a wide network of health care providers and hospitals. It also covers most of the fees for care at Student Health Services. Graduate students should contact UHS to discuss options for health insurance for spouses, domestic partners and dependents. Appointments can be made by visiting UHS's website or by telephone.

4.2.8. PARKING & TRANSPORTATION FACILITIES

<http://www.cmu.edu/parking/> (x8-2052)

CMU Parking & Transportation Services manage parking passes and issue fines for parking violations. Many of the local streets near the campus have parking limited to residents.

4.2.9. UNIVERSITY POLICE

<http://www.cmu.edu/police/> (x8-2323 for emergency only; x8-6232 for non-emergency)

The University Police Department is located at 300 South Craig Street, Room 199 (entrance is on Filmore Street). The department's services include police patrols and call response, criminal investigations, shuttle and escort services, fixed officer and foot officer patrols, event security, and crime prevention and education programming. Its website contains additional information about the staff, escort and shuttle, emergency phone locations, crime prevention, lost and found, finger print services, and annual statistic reports.

CMU publishes an annual campus security and fire safety report describing the policies related to security, alcohol and drug abuse, sexual assault, and fire safety. The report also contains statistics about the number and type of crimes committed on the campus and the number and cause of fires in campus residence facilities during the preceding three years. The report is accessible online at <http://www.cmu.edu/police/annualreports> and available upon request by contacting the University Police Department.

4.2.10. PUBLICATIONS AND WEB RESOURCES

The following regular CMU communications are available online or at the information desk in the Cohon University Center.

- [Tartan](#): The CMU student weekly publication that highlights campus activities such as athletic schedules and scores, lectures, seminars, meetings, concerts, and art exhibits.
- [Tartanswiki](#): Campus resource initiated by the Student Body President and intended to be an all-inclusive information source for all members of the CMU community. Students may log in with the Andrew ID to create, edit and share campus knowledge.
- Handshake: [CMU online recruiting system](#) through Career and Professional Development Center.
- [CMU Event Calendar](#): A listing of current campus events (plays, concerts, recitals, seminars, etc.) and local events of special interest to the academic community.
- [8½ x 11 News](#): A single-sheet weekly update of news about campus events.
- [The Word](#): The Word is CMU's student on-line handbook and is considered a supplement to departmental and college handbooks. The Word contains campus resources and opportunities, academic policy information and resources, community standards information and resources. It is designed to provide all students with the tools, guidance, and insights to help you achieve their full potential as a member of the CMU community.

4.3. SAFETY PROCEDURES

What follows is a brief summary of Safety Practices and Procedures. All students working in laboratories must receive appropriate laboratory safety training. See the CMU [Environmental Health & Safety](#) website for details. Upon entering a laboratory, students should familiarize themselves with the safety features available in case of emergency and pay attention to the locations of:

- Fire extinguishers, their type and method of operation and fire escape routes
- Emergency eyewash fountains and safety showers
- Emergency telephone contact (to report a fire or other emergencies call x8-2323)
- Nearest emergency exit

The student should talk to the advisor about the acquisition or replacement of safety equipment if he/she feels that additional safety equipment is needed or the existing equipment is not working properly. Students should follow all the laboratory safety procedures as established by the Department or CMU. The following safe practices should be observed in the laboratory at all times. Repeated violation may lead to dismissal from the laboratory.

- Use of proper eye protection as required by CMU safety rules
- No eating, drinking, applying cosmetics, or wearing of ear buds in the laboratory
- No wearing of open-toe shoes in the laboratory

4.3.1. WORKING ALONE

Working in a laboratory alone can be hazardous particularly for students who have not been fully trained. All students must obtain permission from the research advisor and file a [form](#) with the [Environmental Health & Safety](#) before he/she is allowed to work alone in the laboratory. When working alone outside the hours of 7 a.m. to 10 p.m., Monday through Friday, the student is recommended to arrange periodic checks with the Security (x8-2323), to help in dealing with any emergency situations as well as in discouraging potential assailants.

4.3.2. OPERATING EQUIPMENT AND USING CHEMICALS

The student must receive instructions in operating machinery or equipment by a qualified person such as the advisor or senior laboratory technician/researcher. The student should never use a piece of equipment without the permission of the person responsible. Hair and loose clothing (ties, sleeves, etc.) must be secured when working around moving machinery. All chemicals must be properly identified, stored, and disposed. Students who have used hazardous materials must follow the [closeout procedures](#) before leaving or graduating from CMU.

The student must pay attention to telephone numbers of the laboratory supervisor and personnel designated as emergency contact, in addition to any other pertinent information regarding the operation and shutdown of equipment as posted inside the laboratory. Equipment for which failures can result in a fire, spill of material, explosion, or flood must be attended at all times or provision made for periodic inspections.

5. KEY OFFICES FOR GRADUATE STUDENT SUPPORT

5.1. OFFICE OF THE ASSISTANT VICE PROVOST FOR GRADUATE EDUCATION

<http://www.cmu.edu/graduate>

The Office of the Assistant Vice Provost for Graduate Education, AVPGE, directed by Suzie Laurich-McIntyre, Ph.D., provides central support for graduate students in a number of roles. These include: being an ombudsperson and resource person for graduate students as an informal advisor; resolving formal and informal graduate student appeals; informing and assisting in forming policy and procedures relevant to graduate students; and working with departments on issues related to graduate students and implementation of programs in support of graduate student development.

The Office of the AVPGE often partners with the Division of Student Affairs to assist graduate students with their CMU experience. Senior members of the student affairs staff are assigned to each college as college liaisons and are often consulted by the Assistant Vice Provost for Graduate Education and departments on an individual basis to respond to graduate student needs.

The Office of the AVPGE offers a robust schedule of professional development opportunities. Some are geared towards a specific population (M.S. students, Ph.D. students at the beginning of their program, graduate students seeking tenure track faculty positions, etc.) and others are open to all graduate students (time management, balancing, staying healthy). A full schedule of programs can be found at its website.

The Office of the AVPGE also coordinates several funding programs, and academically focused seminars and workshops that advise, empower and help retain all graduate students, particularly graduate students of color and women in the science and technical fields. The fundamental goals of its programs have been: first, to support, advise and guide individual graduate students as they work to complete their degrees; second, to contribute to the greatest degree possible to the diversification of the University. Visit the Graduate Education website for information about:

- Conference Funding Grants
- Graduate Small Project Help (GuSH) Research Funding
- Graduate Student Professional Development: seminars, workshops and resources
- Graduate Women Gatherings (GWG)
- Inter-university Graduate Students of Color Series (SOC)

5.2. OFFICE OF THE DEAN OF STUDENT AFFAIRS

<http://www.cmu.edu/student-affairs/index.html>

The Office of the Dean of Student Affairs provides central leadership of the metacurricular experience at CMU. The offices that fall under the Division of Student Affairs led by the Dean of Student Affairs Gina Casalegno, include (not an exhaustive list):

- Athletics
- Career and Professional Development Center
- Cohon University Center
- Counseling & Psychological Services (CaPS)
- Housing & Dining Services
- Office of Community Standards and Integrity
- Office of Student Leadership, Involvement, and Civic Engagement
- University Health Services
- Wellness Initiatives

Graduate students will find the enrollment information for Domestic Partner Registration and Maternity Accommodations in the Office of the Dean of Student Affairs and on its website. The Office of the Dean of Student Affairs also manages the Emergency Student Loan (ESLs), which service is made available through the generous gifts of alumni and friends of CMU. The Emergency Student Loan is an interest-free, emergency-based loan repayable within 30 days. Loans are available to enrolled students for academic supplies, medication, food or other expenses not able to be met due to unforeseeable circumstances. The Office of the Dean of Student Affairs also provides consultation, support, resources, and follow-up on questions and issues of Academic Integrity as described in <http://www.cmu.edu/academic-integrity>.

5.3. ASSISTANCE FOR INDIVIDUALS WITH DISABILITIES

Students with disabilities are encouraged to self-identify with Equal Opportunity Services by contacting Catherine Getchel, 412-268-6121, getchell@cmu.edu to access the services available and initiate a request for accommodations. For more information please see <http://www.cmu.edu/education-office/disability-resources/>.

5.4. EBERLY CENTER FOR TEACHING EXCELLENCE & EDUCATIONAL INNOVATION

<http://www.cmu.edu/teaching>

Support for graduate students who are or will be teaching is provided in many departments and centrally by the Eberly Center for Teaching Excellence & Educational Innovation. The Eberly Center offers activities for current and prospective teaching assistants as well as any graduate students who wish to prepare for the teaching component of an academic career. The Center also assists departments in creating and conducting programs to meet the specific needs of students in their programs. Specific information about Eberly Center support for graduate students can be found at: <http://www.cmu.edu/teaching/graduatestudentsupport/index.html>.

5.5. CARNEGIE MELLON ETHICS HOTLINE

The health, safety and well-being of the university community are top priorities at CMU. CMU provides a hotline that all members of the university community should use to confidentially report suspected unethical activity relating to financial matters, academic and student life, human relations, health and campus safety or research. Students, faculty and staff can anonymously file a report by calling 877-700-7050 or visiting <http://www.reportit.net> (user name: tartans; password: plaid). All submissions will be reported to appropriate university personnel. **The hotline is NOT an emergency service. For emergencies, call University Police at 412-268-2323.**

5.6. GRADUATE STUDENT ASSEMBLY

<http://www.cmu.edu/stugov/gsa/index.html>

This is the core of traditional student government, as governed by the Student Body Constitution. The CMU Student Government consists of an Executive Branch and a Legislative Branch. The Executive Branch serves the entire student body, graduate and undergraduate, and consists of one president and four vice-presidents. The Legislative Branch for graduate students, The Graduate Student Assembly (GSA), passes legislation, allocates student activities funding, advocates for legislative action locally and in Washington D.C. on behalf of graduate student issues and needs, and otherwise acts on behalf of all graduate student interests. GSA also contributes a significant amount of funding for conferences and research, available to graduate students through application processes. GSA also plans various social opportunities for graduate students and maintains a website of graduate student resources on- and off-campus, <http://www.cmu.edu/stugov/gsa/resources/index.html>. Each department has representation in GSA and receives funding directly from GSA's use of the student activities fee for departmental activities for graduate students. The department representative(s) is the main avenue of graduate student representation of and information back to the graduate students in the department.

5.7. INTERCULTURAL COMMUNICATION CENTER (ICC)

<http://www.cmu.edu/icc/> (x8-4979)

The Intercultural Communication Center (ICC) is a support service offering both credit and non-credit classes, workshops, and individual appointments designed to equip non-native English speakers (international students as well as international students who attended high school in the U.S.) with the skills needed to succeed in academic programs at CMU. In addition to developing academic literacy skills such as speaking, reading and writing, students can learn more about the culture and customs of the U.S. classroom. The ICC also helps international teaching assistants (ITAs) who are non-native English speakers develop fluency and cultural understanding to teach successfully at CMU, and provides ITA testing, required testing indicating that a non-native speaking student has a language proficiency required before being allowed to work with undergraduates in classes, labs or individual meetings.

5.8. OFFICE OF INTERNATIONAL EDUCATION (OIE)

<http://www.studentaffairs.cmu.edu/oie/> (x8-5231)

CMU hosts international graduate and undergraduate students who come from more than 90 countries. Office of International Education (OIE) is the liaison to CMU for all non-immigrant students and scholars. OIE provides many services including: advising on personal, immigration, academic, social and acculturation issues; presenting programs of interest such as international career workshops, tax workshops, and cross-cultural and immigration workshops; supporting international and cultural student groups such as the International Student Union and the International Spouses and Partners Organization; maintaining a resource library that includes information on cultural adjustment, international education and statistics on international students in the United States; posting pertinent information to students through email and the OIE website, and conducting orientation programs.