

PME PhD Graduate Handbook (rev. 19 August 2024)

Degree Programs: PME PhD students are enrolled in one of two degree programs: the PhD in Molecular Engineering (ME PhD) or the PhD in Quantum Science and Engineering (QSE PhD). The requirements for the two degree programs are identical, except for the fact that the QSE PhD students must pursue the Quantum Engineering thematic area for their coursework.

Course Requirements: PME PhD students are expected to complete a total of nine (9) courses as part of their degree requirements: (i) three (3) core courses within one of the three thematic cores (i.e., Immunoengineering, Materials for Sustainability and Health, or Quantum Engineering), (ii) four (4) in-depth courses in the research field of choice (i.e., any graduate-level STEM courses), and (iii) two (2) broad elective courses (free choice). The core and in-depth courses should typically be selected in consultation with the Primary Academic Advisor(s) and, if applicable, the Primary PhD Program Advisor, or – prior to a student matching into a research group – their assigned PME faculty advisor (see **Advising**). Courses used to meet degree requirements must be completed with a B grade or better.

Core Courses are designed specifically for students in each of the three PME research themes, teach fundamental principles, methodologies, and/or systems. These courses aim to provide a foundation for advanced coursework and research in the thematic areas. A list of the core courses for each theme is provided in **Appendix A**.

In-Depth Courses can include PME courses as well as courses from fellow STEM departments such as, but not limited to, physics, chemistry, biophysics, computer science, mathematics, statistics, data science, cancer biology, immunology, biochemistry and molecular biophysics, and ecology and evolution. These courses give students specialized knowledge in their research field of choice.

Broad Elective Courses serve to help students develop skills in leadership, communication, technology development, and product design. They also serve to help students acquire or renew basic understanding in STEM subject areas. Students may also consider courses in other divisions such as public policy, business, or the humanities. Students may also opt to use their Broad Electives to take additional technical courses at any level.

The three core and four in-depth courses must be completed by the end of the winter quarter of the second year in order to be admitted to candidacy. If these seven courses are not completed by the end of the winter quarter of the second year, the student will be placed on probation for the spring quarter of their second year. If these seven courses are not completed by the end of the spring quarter of their second year, the student will be asked to leave the PhD program.

It is not unusual for students to complete their core and in-depth courses by end of spring quarter of the first year. Students who feel they may benefit from taking preparatory courses in advance of

the core and in-depth courses (e.g., undergraduate-level courses) may choose to do so in their first year but must complete the core and in-depth courses on schedule by the end of the winter quarter of the second year.

The two broad elective courses must be completed prior to graduation. Typically, students choose to fulfill this requirement along with their thematic core and in-depth course requirements during the first and second year.

First-Year Seminar: All first-year PME PhD students are required to register for and attend MENG 40300 – PME Research Professionalization Seminar. This course provides an overview of the types of competencies and non-academic knowledge associated with successful research. Grades for this course are pass/fail and are based on participation and attendance. Students who miss more than two classes and/or who do not complete the Responsible Conduct of Research training will receive a failing grade (see **Course Performance**).

Course Load: PME PhD students are required to maintain full-time enrollment of at least 300 units of credit and no more than 400 units of credit in all four quarters, including summer quarter, to remain in good academic standing. This can be satisfied by a combination of formal instructional courses and MENG 49900 – Research: Molecular Engineering (see **MENG 49900**). In general, students will satisfy the course load requirement in their first year largely through instructional courses and in later years through MENG 49900.

MENG 49900 – Research: Molecular Engineering: Students may elect to satisfy some or all of their course load each quarter by registering for MENG 49900 – Research: Molecular Engineering with their Primary Academic Research Advisor, or, if the Primary Academic Research Advisor is not a PME faculty member, their Primary PhD Program Advisor. In rare cases, it is possible for students to register for MENG 49900 with the Director of Graduate Studies. Students are not typically eligible to register for MENG 49900 in the first quarter of their first year. In general, students beyond the first year of the PhD program will satisfy their enrollment requirements through MENG 49900.

The MENG 49900 faculty advisor is responsible for submitting grades for this course at the end of each quarter. Missing grades affect a student's academic progress and eligibility for admission to candidacy and graduation. Students receiving a failing grade in MENG 49900 (F or letter grade below C) will be placed on quarterly Academic Progress Reviews (see **Academic Progress Review**). A second unfavorable Academic Progress Review may result in the Primary Academic Research Advisor(s) choosing to stop serving in that capacity and the student ultimately being asked to leave the program (see **Advising**).

Course Performance: Students must pass 300 units at C grade or better each quarter to remain in good academic standing. For MENG 49900, a P grade is interpreted as a C or better. Failure to pass 300 units at C grade or better **and/or** receiving less than a passing grade (defined as a C grade or better for letter graded courses) for one or more courses will result in a student being placed on academic probation. With the exception of MENG 49900, courses without letter grades cannot be used to satisfy this requirement.

To return to good academic standing, the student must successfully pass 300 units at C grade or better in the following quarter. MENG 49900 can be used to satisfy this requirement, for which a P

grade will be interpreted as a C or better. With the exception of MENG 49900, courses without letter grades cannot be used to satisfy this requirement. Students on probation who fail to return to good academic standing in the following quarter will be asked to leave the program.

Advising: The PME's highly interdisciplinary environment provides opportunities to be academically advised by multiple faculty members within the school as well as faculty throughout the University of Chicago. Students may also choose to be advised by Argonne National Laboratory scientists approved to supervise students through the Graduate Research Cooperative as Consortium for Advanced Science and Engineering (CASE) affiliates of PME. Students who match to a Primary Academic Research Advisor who is not a PME faculty member must also secure a PME faculty member to serve as a Primary PhD Program Advisor.

Incoming PME PhD students identify potential Primary Academic Research Advisor(s) through a variety of mechanisms: one-on-one interactions during PhD admitted students visits; meetings and interactions during orientation week; attending scheduled PhD match talks; email exchanges; individual meetings; and – by direct arrangement with, and at the discretion of, the potential advisor – attending research group meetings and participating in a research rotation during the summer prior to, or autumn/winter quarters of, the first year.

First year PME PhD students are required to secure a Primary Academic Research Advisor(s) before the end of the second quarter of their first year. Failure to match to a Primary Academic Research Advisor(s) by this time will result in the student falling out of good academic standing. Students will be centrally supported by PME through the end of the third quarter of their first year to provide additional time to secure a Primary Academic Research Advisor(s). Students who fail to secure a Primary Academic Research Advisor(s) by the end of the third quarter of their first year will be asked to leave the program.

All PME PhD students are required to be continuously engaged with a Primary Academic Research Advisor after the second quarter of their first year. If at any time and for any reason a student is not being advised and financially supported by a Primary Academic Research Advisor, the student and Primary Academic Research Advisor must inform the Director of Graduate Studies of the appropriate PME PhD degree program immediately. The student will be centrally supported by the PME through the end of the quarter in which they leave the group, and the following quarter, to provide an opportunity to match with a new Primary Academic Research Advisor. Failure to do so by that time will result in the student being asked to leave the PhD program. Students will be eligible to leave the program with a terminal master's degree if they have been registered full time within the PME for a minimum of three quarters and completed at a grade of C or above (i) the three core and four in-depth courses and (ii) at least 200 units of MENG 49900 – Research: Molecular Engineering, for a total of 900 units.

A student can elect to discontinue pursuing their PhD research project with their Primary Academic Research Advisor at any time. A Primary Academic Research Advisor may choose to discontinue advising a student for poor academic progress (see **Academic Progress Review**).

Questions about identifying a Primary Academic Research Advisor should be directed to the Director of Graduate Studies, Vice Dean for Education and Outreach, and/or Dean of Students.

Candidacy: Admission to doctoral candidacy within PME is an acknowledgement of a student's potential both to successfully carry out independent research and to make a meaningful contribution to the field of engineering. In addition to completing the three core and four in-depth courses by the end of winter quarter of their second year, in order to pass into candidacy, students will also develop, present, and defend a research proposal describing the objectives, approaches, and expected outcomes of their PhD thesis research. The written proposal should be prepared in consultation with the Primary Academic Research Advisor(s) in an NSF or NIH format and must be submitted to the Candidacy Committee by January 15th – or two weeks prior to the candidacy exam date, whichever is earlier – in the student's second year. An oral exam presenting and defending their proposal to their Candidacy Committee must be completed before March 15th in the student's second year.

The oral exam will be scheduled for two (2) hours. The oral presentation should be expected to last approximately 45 minutes without interruptions and should typically make use of slides or other visual aids. The student will have the first 25 minutes of the examination to present without interruptions. It is the student's responsibility to schedule the examination, make room reservations, and ensure any required projection equipment is available. The written proposal and oral presentation will serve as a starting point for questions from the Candidacy Committee, but students can expect the discussion to be wide ranging and cover any material deemed germane by the committee members, including background and context of the project, project aims, progress to date, course material, and general science and engineering knowledge.

The Candidacy Committee is composed of three to four faculty members including the student's Primary Academic Research Advisor(s) and, if the Primary Academic Research Advisor(s) is not a PME faculty member, the Primary PhD Program Advisor. At least two members of the committee must be PME faculty members. CASE affiliates of PME may not be counted towards the required headcount of PME faculty members. The candidacy committee should be composed in consultation with and approved by the Primary Academic Research Advisor(s). Changes to the composition of the candidacy committee must be made in consultation with and with the approval of the Director of Graduate Studies.

Altogether, admission to candidacy will depend on an evaluation of academic performance, research performance, and the research proposal. There are three possible outcomes for candidacy review:

(1) *Pass.*

(2) *Deficient with Opportunity to Retake.* Students in this category will have the opportunity to retake the oral exam by the end of the spring quarter of the second year. If the student fails the retake, they will be asked to leave the PhD program. Students will be eligible to leave the program with a terminal master's degree if they have been registered full time within the PME for a minimum of three quarters and completed at a grade of C or above (i) the three core and four in-depth courses and (ii) at least 200 units of MENG 49900 – Research: Molecular Engineering, for a total of 900 units.

(3) *Fail.* Students in this category will not be given the option to re-sit the exam and will be asked to leave the PhD program. Students will be eligible to leave the program with a terminal master's

degree if they have been registered full time within the PME for a minimum of three quarters and completed at a grade of C or above (i) the three core and four in-depth courses and (ii) at least 200 units of MENG 49900 – Research: Molecular Engineering, for a total of 900 units.

A candidacy timeline is provided in **Appendix B**.

Doctoral Dissertation: After passing into candidacy, the student will develop a doctoral dissertation representing an original contribution to the scholarship in their field. Every student in the PME PhD program is required to prepare, submit and defend an original dissertation thesis project. The Primary Academic Research Advisor(s) are responsible for guiding and supervising the student in this process.

The doctoral dissertation should typically be completed, and the doctoral thesis defense held, by the end of the student's sixth year of study. The scheduling of the defense must be done in coordination with, and with the approval of, the Primary Academic Research Advisor(s) and, if applicable, the Primary PhD Program Advisor. It is the student's responsibility to schedule the examination, make room reservations, and ensure any required projection equipment is available.

The Dissertation Defense Committee is composed of three to four faculty members including the student's Primary Academic Research Advisor(s) and, if applicable, the Primary PhD Program Advisor. At least three members of the committee must be University of Chicago faculty members and at least two members of the committee must be PME faculty members. CASE affiliates of PME may not be counted towards the required headcount of University of Chicago or PME faculty members. The committee should be composed in consultation with and approved by the Primary Academic Research Advisor(s) and, if applicable, the Primary PhD Program Advisor.

Detailed instructions and guidelines on how to meet requirements for University of Chicago dissertations are available in the [University's student manual](#), in the [University-Wide Requirements for the PhD Dissertation](#), and on the [Dissertation Office website](#). Students are urged to review these resources early in the writing process. The final copy of the dissertation must be uploaded to the Dissertation Office site by the deadline specified by the Dissertation Office each quarter.

Deadlines for a particular quarter may vary slightly. Be sure to check with the PME Dean of Students Office for the quarter in which you plan to graduate. Helpful information can be found at the following links: [PME Defense and Graduation Information Sheet](#), [Dissertation Checklist](#), [Dissertation Deadlines](#), [Degree Conferral & Convocation Dates](#), and [University Registrar Financial Obligations](#). A degree application is valid only for the quarter in which it is made. Currently, a fee of \$65 will be charged for each degree application that is canceled after the end of the fifth week of the quarter in which it is filed.

Academic Progress Review: Academic progress will be reviewed annually, typically at the end of the spring quarter of each year, although the Primary Academic Research Advisor(s) can choose to trigger formal progress reviews at any time. The student will have the opportunity to meet formally with the Primary Academic Research Advisor(s) and, if applicable, the Primary PhD Program Advisor to discuss their academic progress prior to submission of the Academic Progress Review.

Students receiving an unfavorable Academic Progress Review and/or a failing grade in MENG 49900 – Research: Molecular Engineering will be placed on quarterly academic reviews. For MENG 49900,

a failing grade is a C- or below, or an F on a pass/fail basis. A second unfavorable Academic Progress Review may result in the Primary Academic Research Advisor(s) choosing to stop serving in that capacity and the student ultimately being asked to leave the program (see **Advising**).

Teaching Requirement: In addition to coursework and research, pedagogical training is an important component of the doctoral training provided within PME. Teaching assignments are determined based on department need, although consideration is also given to student and faculty preferences whenever possible. Students must either complete two quarters as a Teaching Assistant for a PME course, or one quarter as a Teaching Assistant for a PME course and the equivalent of a second TAship credit in an approved alternative activity (or activities). The availability of approved alternatives is limited, and the list of approved alternatives may change. Most students fulfill this requirement with two TAships. The teaching requirement must be completed before graduation.

Occasionally students receive TA credit for TAing a course outside of the PME. These appointments are made by the department administering the course, not by the PME. Students interested in receiving TA credit for a future TAship outside of the PME should first discuss with their Primary Academic Research Advisor, and then send their request to the Assistant Director of Academic Programs. These requests are considered on a case-by-case basis, and decided primarily on the appropriateness of the course and the ability of PME to meet its own TAing needs. Not every request can be accommodated, and retroactive requests will not be considered.

During the quarters that a student is serving as a teaching assistant for a PME parented course as part of the PME Teaching Requirements, the student will be appointed as a TA and receive salary and tuition equivalent to their standard financial package supported centrally by PME.

Deviations from Timeline: Deviations from the standard timeline and deadlines for academic progress delineated above may be approved by petitioning the Director of Graduate Studies for the appropriate PhD program. Examples of common deviations for which individualized timelines and deadlines are formulated by the Director of Graduate Studies in consultation with the Primary Academic Research Advisor(s) and the student are:

- *Leaves of absence.* A leave of absence almost always results in individualized timelines and deadlines for a student if taken in the first or second year. Primary Academic Research Advisor(s) are also subject to timelines, deliverables, milestones, and other constraints related to grants and resources, so although taking a leave does not impact academic standing, it is not always possible for students to take leaves and return to the same Primary Academic Research Advisor(s) and academic research project. The circumstances surrounding taking a leave and returning from leave should be delineated in as much detail as possible as early as possible. After discussing with the Director of Graduate Studies and Primary Academic Research Advisor(s), the student may file a formal leave of absence request with the Dean of Students.
- *Mid-year start to the PhD program.* In some instances, such as a delay in obtaining a visa, students start mid-year instead at the beginning of autumn quarter. Due to the schedule of course offering and other constraints, individualized programming is often required.

- *Students with non-traditional backgrounds.* The PME encourages students with non-traditional academic preparations to apply to and pursue our PhD programs. Through the admissions process, student advising (starting soon after the students accepts the offer from one of the PME's PhD programs), and self-identification, students may discuss with their faculty advisor to explore individualized course programming to enable success in the PhD program, especially with respect to the graduate-level course requirements. Plans can be made, for example, for a student to take key foundational undergraduate courses as electives in the first year to be on track to complete the thematic core and in-depth courses by the end of the spring quarter of the second year, and perhaps emphasize research earlier on in the first year in preparation for candidacy.

Maximum Residency Time: If a student completes six years in the PhD program excluding time on leave without graduating, then the student and the Primary Academic Research Advisor(s) must submit a petition to the Dean to request permission to stay for an additional year, with a detailed timeline to meet all graduation requirements. Only under extremely rare circumstances will a student be allowed to stay more than seven years in total.

Appointments: Appointments as a research assistant (RA) or teaching assistant (TA) are made on a quarterly basis to track correct allocation to specific funding sources and to facilitate and avoid mistakes in transferring back and forth between research and teaching appointments. Reappointment is typically routine except under the conditions described above in which the student is not meeting academic program milestones or making satisfactory academic progress (see **Academic Progress Review**).

Ethics and Safety Training: All PME PhD students, regardless of funding source, are required to obtain research, ethics, compliance, and safety certification through the Collaborative Institutional Training Initiative (CITI). An official notice of certification will be posted on UChicago transcripts.

Although codes, policies, and principles are important and useful, like any set of rules, they do not cover every situation, can conflict, and require interpretation. It is therefore important for researchers to learn how to interpret, assess, and apply various research rules and how to make decisions and act ethically in various situations. Overall, graduate researchers are expected to create and support a collaborative climate, so as to minimize concerns that ideas may be appropriated by others; be honest and realistic in stating claims or estimates based on available data and understand the limitations of your knowledge; be honest and professional in interactions which includes being cognizant of, and vigilant against, the negative consequences of conscious or unconscious bias; and welcome constructive criticism of personal scientific research and offer the same to colleagues in a manner that fosters mutual respect and objective scientific debate

Career Planning Resources: PME PhD students can engage in purposeful and structured career development and professional skill-building across a range of competencies – all aimed to position them for success in a dynamic and global work environment. The PME fosters these competencies in targeted workshops and supplemental programming, individualized advising appointments, as well as in coursework and in laboratory training.

Whether preparing for a career path in academia, industry, nonprofits, or government, meeting individually with a professional career advisor can be instrumental in a career journey. Advising conversations can focus on a range of topics, including but not limited to: exploring skills and

interests as it relates to identifying career options, connections to alumni and external partners, job search and networking best practices, crafting effective job documents, and negotiating job offers.

PME PhD students have several career advising support options. All graduate students are welcome to meet individually with the PME's Director of Career Development who can provide engineering-specific advising and career development support. In addition, the office of [UChicagoGRAD](#) offers career support that is more general in nature. Graduate students can schedule career advising appointments directly with an advisor in this office through the [GRAD Gargoyle](#) platform.

Grievance Policy: The University of Chicago is a community of scholars dedicated to research, academic excellence, and the pursuit and cultivation of learning. Every member of the University – students, faculty, and staff – makes a commitment to strive for personal and academic integrity; to treat others with dignity and respect; to honor the rights and property of others; to take responsibility for individual and group behavior; and to act as a responsible citizen in a free academic community and in the larger society. In this context, complaints, concerns, and allegations of abuse of authority are taken seriously and PME is dedicated to supporting students' academic journeys. If there are concerns or inquiries related to academic progress, advisors, or research groups, students are encouraged to reach out in this order to the Academic Program Team, Dean of Students Office, Director of Graduate Studies, or Vice Dean for Education and Outreach. Confidentiality will be preserved when possible and appropriate. The [PME Grievance Policy and Procedures](#) provides a full accounting of the options available and processes to be followed.

Personnel: A list of names, contact information, and roles of personnel involved in administration of PME Academic Programs and the PME Dean of Students Office is provided in **Appendix C**.

Appendix A – Thematic Core Courses

Immuno-Engineering (3)	MENG 33100	Biological Materials
	MENG 33200	Principles of Immunology
	<i>Choose one of the following:</i>	
	1. MENG 33110	Stem Cell Biology, Regeneration, and Disease Modeling
	2. MENG 33130	Proteomics and Genomics in Biomolecular Engineering
Materials Systems for Sustainability and Health (3)	MENG 31100	Math Methods in Molecular Engineering
	<i>Choose two of the following:</i>	
	1.MENG 31200	Thermodynamics and Statistical Mechanics
	2.MENG 31300	Transport Phenomena
	3.MENG 35100	Introduction to Polymer Science
	-OR-	
CHEM 39000	Solids, Materials, Surfaces	
Quantum Engineering (3)	MENG 31400	Advanced Quantum Engineering
	PHYS 34100	Graduate Quantum Mechanics-1*
	PHYS 34200	Graduate Quantum Mechanics-2

**Students who have already taken an advanced quantum class can replace PHYS 34100 with either MENG 37400 Advanced Quantum Information or MENG 37200 Quantum Dissipation and Quantum Measurement.*

Appendix B – Candidacy Timeline.

Candidacy Timeline for PME Students in their Second Year of Study

December 1	Deadline for students to submit the following materials: <ol style="list-style-type: none">1. title,2. short abstract of proposed research,3. list of the candidacy review committee members,4. confirmed date, time, and place for the review.
January 15 Or at least 2 weeks before the exam, whichever is earlier	Deadline for students to submit the full research proposal online and to their candidacy committee members.
March 15	Deadline for completion of the candidacy review.

Appendix C – Academic Programs and Dean of Students Personnel

Academic Programs

Prof. Andrew Ferguson	andrewferguson@uchicago.edu	Vice Dean for Education and Outreach; Director of Graduate Studies for the PhD in Molecular Engineering
Prof. Aash Clerk	aaclerk@uchicago.edu	Director of Graduate Studies for the PhD in Quantum Science and Engineering
Prof. Cathryn Nagler	cnagler1@uchicago.edu	Educational Lead for Immunoengineering
Prof. Terry Johnson	tdj@uchicago.edu	Senior Instructional Professor; Program Director, Master of Engineering
Prof. Mark Stoykovich	stoykovich@uchicago.edu	Senior Instructional Professor; Director of Undergraduate Studies
Tracy Walker	twalker22@uchicago.edu 773.834.6202	Director of Academic Programs and Equity, Diversity, and Inclusion
Stella Wang	stellawang@uchicago.edu 773.834.6593	Assistant Director of Academic Programs – MEng and Undergraduate Studies
Anna Kent	kent1@uchicago.edu 773.702.1913	Assistant Director of Academic Programs – ME and QSE PhD

Dean of Students Office

David Taylor	davidtaylor@uchicago.edu 773.834.2057	Dean of Students <i>David is generally responsible for student status changes (e.g., leaves of absence and graduation), academic and behavioral disciplinary issues management, and providing/coordinating support for students with disabilities and health difficulties. He also regularly meets with individual students to discuss academic opportunities, lab difficulties, and general well-being.</i>
Brett Stachler	bstachler@uchicago.edu 773.702.1592	Associate Dean of Students for Recruitment and Admissions <i>Brett collaborates with faculty to manage and organize the PME recruitment and admissions efforts and events. They also serve as a point of contact and resource for faculty and their</i>

		<i>support staff to UChicago and external stakeholders regarding the PME admissions and recruitment processes, policies, and procedures. Additionally, they provide 1:1 and group support to current students, and work with Dean of Students team members to develop a sense of community for current students in the PME.</i>
Ozge Kocak Hemmat	kocakozge@uchicago.edu 773.834.4791	Assistant Dean of Students for Registration and Data Management <i>Ozge supports the Office of the Dean of Students at the Pritzker School of Molecular Engineering (PME). Her responsibilities include managing student records (academic progress, TA assignments), matriculation (onboarding, orientation, and training), graduation, data management, analysis, and reporting.</i>

Career Development

Briana Konnick	bkonnick@uchicago.edu 773.834.7933	Director of Career Development
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