

PURDUE Weldon School of Biomedical Engineering PhD Handbook

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PURDUE Weldon School of Biomedical Engineering PhD Handbook

Mission & Vision

Overall Vision for Weldon Grad Program: Aspirations of the Program

An exceptional graduate education and training program that empowers the next generation of leaders in biomedical engineering to contribute to improving healthcare delivery, patient outcomes, and quality of life through pioneering scientific discoveries and their translation

Overall Mission for Weldon Grad Program: Achieving our Vision

To provide an exceptional training environment for Weldon School's trainees that is grounded in 1) broad mentorship from faculty, staff, and peers, 2) a consistent curriculum grounded in both fundamental theories and practical applications of biomedical engineering that prepares trainees to perform ethically, scientifically and technically rigorous research, 3) exceptional facilities for performing collaborative, multi-disciplinary research using cross-functional methods, 4) individualized professional development opportunities, and 5) an environment with a shared culture and values that allows each trainee to achieve their highest potential.

Core Values of the Weldon Grad Program: What We Stand for

- We promote a culture of inclusion and belonging across the Weldon School of Biomedical Engineering.
- We collectively hold all individuals to a high standard of ethical and respectful behavior.
- We provide exceptional mentorship of trainees (broad-based faculty, staff, and peer mentoring of each individual).
- We implement empathy, grace, and intentionality in all our activities.
- We provide BME graduate students with support for a well-rounded training environment where they can achieve their highest potential.
- We support graduate students' engagement in professional development opportunities that will enhance and strengthen their portfolio for their chosen career path.
- We celebrate and cultivate a diverse set of professional and cultural identities that make each member unique and collectively make the Weldon School a community that people want to belong to.

Hallmarks of a Weldon PhD degree

- Critical analysis of challenges to human health and wellbeing, through evaluation of emerging and existing solutions, identification of gaps, and generation of testable hypotheses in significant biomedical research areas
- Rigorous and reproducible methods, experiments, and data analyses
- Development and/or use of innovative technologies, techniques, and methods to overcome critical biomedical challenges

- Excellence in scientific and technical communication, through critical analysis, interpretation, and dissemination skills that move the field forward
- Ethical conduct of research

Commitment to Good Mentoring

Respect and Integrity is the bedrock of our community. A lasting and impactful mentoring relationship is a result of clear communication and expectations, professionalism, and consistency. We foster **inclusivity and belonging** by celebrating and recognizing the individuality of each community member. We expect contributions from all and build relationships through collaboration, networking, and team work. We value **developing the individual**. We support the person where they are and coach them to meet their professional and personal goals. We celebrate failures and successes as critical pieces of the growth process.

See APPENDIX A: Graduate Research Credit Syllabus

See APPENDIX B: Student Advisor Expectation Scale

Milestones of the PhD Program

See APPENDIX C: PhD Milestone Timeline

A series of milestones have been developed to facilitate the training of our PhD students on their pathway to becoming independent researchers in biomedical engineering. The following skills are hallmarks of a Purdue PhD in Biomedical Engineering and place our students in a position to succeed and become leaders in one or more of many possible career paths (e.g., academia, industry, clinical, global health):

- Critically analyze the literature and identify research gaps in an area of Biomedical Engineering
- Develop a meaningful research question with a testable hypothesis
- Design rigorous and reproducible experiments to test this hypothesis and fill the identified gap
- Develop and/or use technology to perform these experiments and generate publishable data
- Critically analyze, interpret, and disseminate their own data to move the field forward in fundamental, translational, or clinically relevant ways.
- Participate in all training, research, and related translational activities in an ethical manner

The PhD milestones are checkpoints for students to demonstrate expected competencies in the above skills as they progress through the three stages of our PhD program: *Pre-Qual*, *Post-Qual*, and *PhD Candidacy*. They are also critical opportunities to identify areas of professional growth for each trainee and for the faculty to provide them with the mentoring they need.

Annual Meetings and Individual Development Plans

You will meet with your faculty advisor every fall to complete your individual development plan (IDP). The IDP will change depending on which year of the program you're in. You can find the IDP forms here:

- [BME IDP-Year 1](#)
- [BME IDP-Year 2](#)
- [BME IDP-Years 3+](#)

Qualifying Procedure

[Link to the Qualifying Procedure page](#)

Rationale

This document provides guidance to both students and faculty for understanding the expected standards of performance for the *first milestone in our PhD Training Program – The Qualifying Exam*, which consists of both Written and Oral components that are evaluated by a Mentoring and Qualifying Committee. Successful completion of the Qualifying Exam will advance a *Pre-Qual PhD student* into the second stage of our PhD program as a *Post-Qual PhD student*.

Expectations

The expectations we have set for passing the Qualifying Exam represent a rigorous but attainable bar that is defined by our experience with the level of competency required to ensure likely success in the remainder of our PhD Training Program.

Purpose of the Qualifying Exam

Any independent researcher must be able to propose significant research questions based on existing gaps in the field, which are identified through critical analyses of the literature. This skill is fundamental to any area of BME research, and is thus a major focus of the Qualifying Exam. We do not expect students to be able to propose a full thesis project at the end of their first stage of PhD training. We have found that a solid foundation in fundamentals of the field and the abilities to: 1) critically analyze a small subset of literature on a specific topic of interest, 2) identify gaps in the literature, and 3) plan a research strategy to address that gap by formulating a specific research question with a testable hypothesis are skills that are indicative of future success in PhD-level careers. Thus, these expectations define the bar we have set for advancement to the Post-Qual stage of our PhD training program.

The written and oral components of the qualify exam and mentoring-committee process are designed to evaluate whether the student has reached the bar for competency required to advance to the Post-Qual stage, as well as to discuss appropriate coursework, technical training, and professional development for the student given their desired career path and goals.

The specific goals of our qualifying exam and associated mentoring-committee process are:

- to ensure all doctoral students have appropriate competency in the following areas:
 - Technical foundations in fundamental principals
 - Critical analysis and synthesis of literature
 - Gap or needs identification
 - Development of a specific research question with a testable hypothesis to address the gap/need
 - Appropriate and realistic experimental design to test the hypothesis (in the form of a Research Strategy - not specific thesis aims)
 - Technical and Scientific Communication

- Ethical and responsible conduct of research
- to identify areas of professional growth for each student
- to help the student in development of a training plan to best support their career development

Logistics/Process

Choice of Core Primary Literature on which to base the Qualifying Exam

The qualifying exam is NOT intended to represent the development of an entire thesis proposal, but rather a small-scope topic that addresses the specific goals of our qualifying exam (listed above) and has the potential to lead to the ultimate full thesis proposal. The requirement is that the student can demonstrate the expected competencies required to advance to the Post-Qual student stage of our PhD training program. As such, the student should work with their primary mentor to pick a set of five (5) primary-literature papers as a core basis of evaluation for the qualifying exam. These five papers, along with 1-2 relevant review papers, will be settled by the middle of a student's first semester in the PhD program, with October 31st or March 15th deadlines to submit them as part of the PhD Qualifying Pre-Registration Form. These core papers will form the basis for subsequent assignments in the Research Fundamentals courses in the Fall and Spring semesters, which are designed to help the student develop their written qualifying-exam document and oral presentation. Expanding from the core 5 papers, the student will find an additional 5-10 primary papers independently from their research advisor. Together with the core 5 papers, these papers will form the small set of literature that the student will critically analyze and synthesize to identify the scientific gaps they wish to pursue.

Choice of Research Question

Students are encouraged to develop their qualifying exam Research Question based on the research they plan to pursue for their thesis (although this is not required). This topic should be chosen to allow the student to develop an original experiment that will advance the current state of the chosen research field. The student's proposed research can be related to ongoing work in the mentor's lab or work previously performed by the student, but must ultimately represent a novel research question. While it may be related to ongoing work by others in the lab, the student should complete the qualifying exam without significant input from the faculty mentor(s) after the initial set of core papers are selected on the PhD Qualifying Pre-Registration Form. As such, it is expected that the specific research question will be distinct from or a novel formulation of a research question that has already been proposed and/or funded by the mentor.

Specifically, student proposals must satisfy all of the following criteria:

- 1) No research question can be identical with the student's past (prior to starting the PhD) research projects.
- 2) No research questions can be identical to any goal of ongoing or proposed research projects in the mentor's lab being conducted by the mentor, postdocs, graduate students, undergraduates, or technicians.
- 3) The research questions must be different from those of research groups actively collaborating with the mentor's laboratory.
- 4) be based on the small set of primary literature (i.e., 5 papers chosen by mentor and student, plus 5-10 additional identified by the student).

Research Fundamentals (Qualifying Prep) courses (Fall and Spring)

To develop skills in critical reading, analysis, and synthesis of the literature, students are required to take our two Research Fundamentals courses in their first year. Both courses will include (among other topics) reading and writing assignments. Topics will include: fundamentals of reading and critically analyzing individual primary literature; synthesis of a set of related literature to identify significant gaps in a research area; research question and testable hypothesis development towards rigorous experimental design for addressing open research questions.

These two courses are designed to teach students the fundamental skills they need for developing their own research questions and testable hypotheses, and will help in writing their qualifying exam document. Students with significant prior research experience (i.e., independent development of research question and hypothesis, as in a MS thesis) can request (with mentor signature) a waiver for one or both of these courses. [Waiver of this course requirement](#) is intended to be an exception and not a general rule. Information that will be required includes evidence for prior training and skill attainment in the specific goals of our qualifying exam.

Mentoring and Qualifying Committee Makeup

Because our training program emphasizes rigorous and consistent mentoring throughout a student's training, the qualifying-mentoring committee will consist of:

- The primary research advisor(s)
- 1 additional BME-affiliated faculty member chosen by the student in collaboration with their research advisor(s), who is likely to be on the thesis committee
- 1 outside member (affiliated with BME, but outside the student's thesis committee) chosen by the BME Graduate Committee. This choice will ensure at least 2 research areas are covered on a student's qualifying-exam committee for breadth and uniformity of evaluation across the School.

Part of the oral component of the qualifying exam is a discussion of future coursework, and thus this committee also serves as the student's POS committee (required by graduate school). If the student and mentor(s) wish, additional faculty members inside or outside of Purdue (e.g., key collaborators) may be included in the committee. This committee will thus consist of at least 3 members (4 if co-advisor exists), and except for the outside member will include likely members of the student's ultimate thesis committee. However, complete flexibility exists as the student advances through the training program (i.e., flexibility for both the student and committee members as to the eventual makeup of the thesis committee).

Timing and Logistics of the Qualifying Exam

The default time to take the qualifying exam (submission of written document, and oral defense of document) is in the second half of the Spring semester of Year 1. However, given the diversity of backgrounds and experience of our entering PhD students, flexibility exists for taking the qualifying exam earlier or later than the default (in either case, a request for alternative timing may be submitted to the Graduate Committee by filling out a [policy exception form](#)). In either case, a reasonable non-default timing for starting the qualifying exam will not be used in judgement of student progress in the program.

The PhD Qualifying Pre-Registration Form must be submitted by Oct 31st (March 15th in Spring), which defines the core 5 papers on which the qualifying-prep assignments in the Research

Fundamentals courses and the qualifying exam itself will be centered. By February 1st, (September 15th for Fall) the PhD Qualifying Exam Registration Form must be submitted, which will set the date of the spring Mentoring Committee meeting, and will state whether or not this will be the Qualifying Exam. Students opting to delay the Qualifying Exam still must hold a Mentoring Committee meeting in Year 1. The deadline for this meeting (whether or not it will serve as the Qualifying Exam) will be May 15th (December 20th for Fall). Submission of the electronic Plan of Study (POS) is due June 01 (whether or not the Qualifying Exam is delayed).

If the qualifying exam is taken and not passed, students have the option to retake the qualifying exam one semester later to progress to the second stage of our training program. Except in extenuating circumstances, a student will not be allowed to take the qualifying exam a third time, but rather will be mentored towards an MS degree option or an alternative program. In some cases, the outcome of the first take of the qualifying exam and mentoring discussion will identify that the student is not in the best lab for their skills and career goals, in which case Grad Committee and departmental mentoring will be available to assist in finding a better placement for the student.

See APPENDIX D: Default Qual Exam Timeline

See APPENDIX E: Delayed Qual Exam Timeline

Scheduling the Exam

Scheduling Tool

Use a scheduling tool like [when2meet](#), [doodle](#) etc. when reaching out to your mentoring committee to schedule your exam time. Using a scheduling tool, we reduce the amount of back and forth emails and will simplify finding a date that will work for everyone. Once all exam day details (date, time, location) are confirmed, send a calendar invitation to each of your committee members

Reserving a Conference Room

The MJIS conference room online scheduling system is RAT – Resource Allocation Tool and the link is https://engineering.purdue.edu/ECN/Resources/Tools/RAT/index_local. One caveat: This website can only be accessed if you are logged in on an MJIS computer. Once at the link, click on Biomedical Engineering – Lab Group Meetings and login with your Purdue career account login and password (Boilerkey not needed). Use the calendar to identify a room (see the options below*), determine if it is available on the day and time you need and to submit a reservation request if so.

***MJIS Lab Group Meeting Room 2001 (Room)** - This meeting room is the largest in MJIS and is a restricted access area. There are 30 tables and 60 chairs available for use. It is equipped with a computer, wireless keyboard and mouse, cordless presenter, wireless microphone, projection screen, projector, polycom, sound system, VCR, DVD player, document camera, internet access, single-line telephone (49-61309), white boards and adjustable window shades.

***MJIS Lab Group Meeting Room 2041 (Room)** - This room can seat up to fourteen people and has five tables and twelve chairs. It is equipped with a white board, laptop projector, single-line telephone (49-61331) and internet access.

***MJIS Lab Group Meeting Room 3041 (Room)** - This room can seat up to a maximum of 14 people and has five tables and 14 chairs. It is equipped with a white board, laptop projector,

single-line telephone (49-61421) and internet access. to 5:00 pm on Friday. The key must be returned at 8:00 am on the day following your event.

If there are no available rooms in the building for the time you need, reach out to the graduate programs office for additional options of rooms in building nearby.

Preparation of the Written Document

The first part of the qualifying exam process is the evaluation of a written document that is intended to demonstrate student competency in the areas listed above as well as their research and academic progress and career goals. Preparation of this document will be aided by lectures, discussions, and assignments in the first-year Research Fundamentals courses. The intention is that this document will also serve as a stepping stone towards an initial paper (e.g., review or data paper) as well as toward the student's Thesis Proposal and Training Plan (submitted as part of the Preliminary Exam). The written Qualifying Exam document is expected to be written independently by the student and contain solely their original critical analysis and synthesis of the literature surrounding their research area.

Plagiarism Scanning

All written documents will be passed through plagiarism-detection software by the student's faculty advisor prior to distribution to the committee. Students are encouraged to pass their document through such software on their own during the writing process to be aware of writing/paraphrasing styles that trigger flags for plagiarism, and to adjust their paraphrasing styles appropriately prior to submission. See additional plagiarism resources in the Relevant Resources section. Plagiarism in the qualifying-exam document will be grounds for failure of the exam, and will be reported to the Office of the Dean of Students (ODOS) and Office of Student Rights and Responsibilities (OSRR).

Format Requirements

- 5-10 pages single spaced (including figures, but not including reference section and the additional material described below).
- 11 pt font size or larger. Font must be no more than 15 characters per linear inch (including characters and spaces). At least 0.5-inch margins.
- Reference style can be:
 - IEEE, listed and numbered in order of citation, not alphabetically.
(https://owl.purdue.edu/owl/research_and_citation/ieee_style/ieee_overview.html)
 - AMA format, also listed and numbered in order of citation, not alphabetically, but numbers are cited in text in superscript
(https://owl.purdue.edu/owl/research_and_citation/ama_style/index.html)
 - or APA format, cited in text with author, date and listed in bibliography in alphabetical order
(https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html)

Content

- **Executive Summary or Specific Goals/Aims (.5 pages).** Concisely identify a significant research question and a testable hypothesis that will address an identified need/problem.

Specify the broad goal and research strategy of the proposed project that will be used to test the hypothesis.

- **Scientific Premise of Proposed Work (~2 pages).** Critical analysis and synthesis of 10-15 primary papers from the literature to identify significant scientific gaps, culminating in a concise and explicit statement of a research question and testable hypothesis. *Note: the ~2-page length of this section (similar to a grant proposal) does NOT imply a lack of depth is expected in your critical analysis; rather, the 2-page length requires concise and organized writing about a thorough critical analysis leading to clear gap identification and hypothesis development (you will work on these skills in the Research Fundamentals courses).*
- **Proposed Research Strategy (~1 page).** Describe an experimental strategy that will be used to test the stated hypothesis and fill the identified gap. This section does NOT need to be a full set of specific thesis aims, but rather an appropriate research strategy (an experiment described at a broad level, but with enough detail to demonstrate the feasibility and appropriateness of scope, e.g., rough number of subjects, design specs). Describe the procedures to be used, the data to be collected, the planned analyses of data, and how the data will be interpreted to test your hypothesis/research question. Again, this does NOT need to be a full thesis proposal, only a simple description that is just detailed enough to demonstrate that the proposed work is rigorously designed to test your hypothesis/research question (i.e., to demonstrate required competency to advance to the Post-Qual PhD student stage).
- **Caveats, Potential Problems, and Alternative Approaches (0.25-0.5 pages).** Discuss any potential issues you see in the proposed work and how you will address them if they arise.
- **Ethical Considerations (0.5 pages).** Describe the ethical considerations you will need to address in the proposed work. This does NOT need to be a full Vertebrate Animals or Human Subjects section, but rather a description of any relevant ethical considerations for your work and broadly how you will address them. The purpose at this qualifying stage is simply to demonstrate your awareness of the relevant ethical considerations for your work; the prelim exam will evaluate your ability to address them.
- **TimeLine of Proposed Work (0.25 pages).** Describe the planned timeline of your proposed work to demonstrate appropriateness of scope.
- **Progress Report (1-2 pages).** Describe the research progress you have made to date in the PhD program and how it addresses the feasibility of your proposed work and/or supports your hypothesis. If you have data, this should be presented and critically analyzed. If you do not have data yet (this is completely fine), describe your progress to date and critically analyze what is working and not working to demonstrate that adequate research progress has been made.
- **References** (does not count for page limit).

Other Documents to Include in your Written Qualifying Exam package (not included in page limit):

- **Unofficial transcript**
- **Plan-of-Study (POS) document:** courses taken and planned, with alternates.
- **Individual Development Plan (IDP).** This must be discussed and signed by your primary advisor prior (due Oct 31st) to distribution to the Qualifying-Mentoring Committee.

Evaluation of the Written Document

The written document is submitted to the committee at least two (2) weeks before the Mentoring-Qualifying Committee meeting. Based on the well-defined expectations in this

Qualifying Process document and the Mentoring-Qualifying Committee Meeting Rubric, all faculty on the committee will provide constructive written feedback to the committee Chair (mentor) at least two days prior to the Mentoring-Qualifying Committee meeting so that the committee is aware of significant concerns that need to be addressed during the mentoring meeting/oral exam. The Chair will compile all feedback and provide it to all committee members prior to the committee meeting. The rubric provided by the Graduate Committee is based on the stated expectations and includes checkbox response on progress (e.g., below, at, above expectations), as well as space for bullet comments on strengths and weaknesses (e.g., appropriate literature analysis, scope of hypothesis/needs statement, technical writing). This feedback is ultimately combined with feedback on the mentoring meeting/oral exam and provided to the student to help them understand their performance and areas for growth.

Structure of Oral Component: Qualifying Exam and Mentoring Committee Meeting

A two-hour (non-public) meeting must be held before the specified deadline for the semester in which the student has registered to take the Qualifying Exam (Spring: May 15th; Fall: Dec 20th). This meeting will consist of:

1. a ~30-min oral presentation of the material in the written qualifying submission (written document, coursework taken and planned, career-path plans, and desired professional development).
2. ~45-min discussion on student's proposal and relevant technical background, and
3. ~30-min discussion on coursework- and IDP-related issues
4. ~10-min private discussion among the committee [student excused], and completion of group rubric with constructive feedback
5. ~5-min discussion with student of rubric feedback

The committee, through questions and discussion, will be responsible for evaluating the student's competency in:

1. Breadth of BME fundamentals (*defined by Grad Committee, applied to all students*)
2. Technical depth in research topic (*specific to student and assessed by committee*). Note: Questions on course material and technical foundations critical to topic area are expected to be asked by committee in order to identify gaps in training and suggest further courses or further training, if needed.
3. Identification of research gap and ethical issues
4. Development of research question and testable hypothesis
5. Critical analysis and interpretation of data

Other Mentoring Components of the Oral-Exam Meeting

Discussion of Academic Progress to Date and Planning of Course Work

A joint discussion with all committee members of the POS course work is often valuable in ensuring the student is taking the most relevant and valuable courses to develop the technical skills and knowledge required to become an independent researcher in the student's chosen research area. The outcome of this discussion should be plans for a settled POS document, with a complete list of courses (including several alternates). The benefits of a joint meeting are to provide integrated advice for the student based on the broader perspectives several faculty members can provide. An official POS must be approved and filed electronically with the Graduate School by the end of the second semester of Year 1 (June 1 for Fall entrants).

Discussion of IDP and Career Development Path Advising Resources

An important part of the mentoring committee meeting is to ensure the training plan being developed includes the most appropriate activities to provide the student with the training needed to achieve their technical research as well as their career goals. This will include discussion of the student's IDP and relevant professional development activities within BME, the College, the University, and beyond. The relevant [Career Development Path Advising resources](#) should be discussed to ensure the student is aware of and planning for the experiences needed to succeed in their chosen career path.

Overall Feedback and Potential Outcomes of the Qualifying Exam

At the end of the meeting, the committee will discuss privately the student's level of competency in key areas based on both the written and oral components of the exam. The Chair (primary mentor) will complete a group rubric via Qualtrics based on this discussion, noting any lack of consensus on the form. Each committee member should ensure their specific comments/suggestions/advice are captured on the Qualtrics form for the student will receive. The Chair and Committee will then discuss the outcome with the student based on the rubric to ensure everyone is on the same page as to outcomes.

Possible outcomes are:

- Pass
 - Specific courses can be suggested or required.
- Provisional pass (i.e., one or the other component)
 - Written document revision required (based on specific feedback) within 3 weeks. All revisions must demonstrate significant improvement as documented by committee re-review and rubric completion
 - Oral exam must be repeated within 2 months (based on same written document).
- No Pass (both components have significant issues, or plagiarism or other academic misconduct occurred)
 - Repeat whole process in next semester (not summer)
- Fail (if student does not pass on 2nd attempt)
 - Student would move to MS option or appropriate alternative program, with guidance and mentoring from BME Grad Program.
 -

See APPENDIX F: Qualifying Exam Results Flow Chart

Preliminary Exam Procedure

See APPENDIX G: Prelim Exam Timeline

[Link to Preliminary Exam Procedure Information](#)

Rationale

This document provides guidance to both students and faculty for understanding the expected standards of performance for the second milestone in our PhD Training Program – The Preliminary Examination, which consists of both Written and Oral components that are evaluated by the student's Thesis Committee. The Preliminary Examination is a formal requirement of Purdue's Graduate School, with successful completion of the Prelim advancing a PhD student into *PhD Candidacy* (Weldon's third and final stage of our PhD training program).

Expectations

The expectations we have set for passing the Preliminary Exam represent a rigorous but attainable bar that is defined by our experience with the level of competency required to ensure likely success in completing rigorous, impactful, and independent PhD Dissertation research.

Note: this bar does not require substantial work on the Dissertation to be completed before the Preliminary Exam, merely that sufficient preliminary research has been completed to demonstrate the student's competencies in the areas detailed below.

Purpose of the Preliminary Exam

The Graduate School places responsibility on the department faculty to determine when a PhD student is ready to be admitted into candidacy for the PhD degree. This process culminates with a required preliminary examination, which is administered by the student's PhD Thesis and Mentoring Committee, with the purpose of evaluating whether the student is prepared to undertake independent research for their dissertation.

In BME, candidacy requires that a student demonstrate through both written and oral formats that they have:

- 1) the appropriate depth and breadth of knowledge to complete their dissertation research,
- 2) the ability to conceptualize and perform meaningful research in their chosen area,
- 3) the technical skills required for their PhD dissertation work (or an appropriate plan for obtaining them in a timely manner according to their training plan timeline)
- 4) the intellectual ability to critically analyze and integrate knowledge from the literature to form a significant research question and testable hypothesis appropriate for a dissertation,
- 5) proposed an appropriate experimental design to address their research question adhering to all principles for responsible conduct of research (RCR).
- 6) the ability to communicate well in written and oral formats
- 7) developed an appropriate training plan to complete their dissertation research and professional development to position themselves to be successful in their chosen career path.

Importantly, candidacy does not require that substantial dissertation work be completed or that all training is completed, rather it only requires that the student can demonstrate their readiness to perform independent research for their dissertation project and to obtain the remaining necessary training for career development. **Preliminary examinations must be completed no later than the end of the first semester of the third year of the PhD program.**

Multiple benefits to the student for completing the prelim early include:

- 1) input from the entire thesis committee at a stage that can help to a) improve research-question formulation and experimental design, and b) improve the student's training plan.
- 2) preparation of the written prelim document in the form of a fellowship or grant proposal can help the student be ready to apply for a variety of national fellowships, and
- 3) many fellowships (on and off campus) require the student to be admitted to candidacy in order to apply.

The specific goals of our Preliminary Exam and associated mentoring-committee meeting are:

- to ensure all doctoral students have the appropriate competencies listed above

- to identify areas of continued professional growth for each student
- to evaluate the student's training plan and ensure it will best support their career development

Choice of Dissertation Research Question and Specific Aims

The research question should be chosen to allow the student to develop an original set of Specific Aims that will impactfully advance the current state of the chosen research field. The choice must be supported by a well-developed scientific premise based on the relevant scientific literature.

Specifically, the Research Question or Specific Aims:

- 1) must be novel and distinct from the student's past (i.e., prior to starting the PhD) research projects.
- 2) can be related to ongoing work in the mentor's lab, but must be novel and distinct from ongoing or proposed research projects being conducted by the mentor, postdocs, graduate students, undergraduates, or technicians.
- 3) Must be different from those of research groups actively collaborating with the mentor's laboratory.

In choosing a Research Question and Specific Aims, focus on what you can do that is independent and that will have impact on the field. Challenge yourself to be innovative, but in impactful ways that will allow you to move the field forward.

Thesis Advisory and Mentoring Committee Makeup

Broad advising on the student's dissertation research and training plan is important throughout the PhD Training Program. The Thesis and Mentoring Committee must include at least four members total, at least two of which must be BME faculty members from the Weldon School, as well as one outside faculty member that is affiliated with another department at Purdue or another institution. If you are considering someone outside Purdue, you must submit the person's CV to the BME graduate office in order for them to request their special appointment. The CV must be submitted at least 30 days prior to your prelim to ensure they are approved by BME and COE in time to be listed on the Form 8. Note that the Grad School requires at least 51% of the committee to be Purdue faculty members.

Timing and Logistics of the Preliminary Exam

The prelim examination is to be completed before the end of the first semester of the third year of a student's PhD program. The oral exam must be formally scheduled with the Graduate School at least 15 days prior to the proposed exam date (via GS Form 8). This form must be initiated by the student and signed by the BME graduate office, your research advisor and the BME Head at least 15 days before the proposed date of the exam. In the case of co-advisors, only one of them will need to sign. The exam is not officially scheduled until the Purdue Graduate School grants the final approval. A written prelim document (described below) must be submitted to the thesis committee two weeks prior to the scheduled oral exam (committee must approve any delays to this deadline).

The oral exam consists of a public presentation with questions from the audience and a closed-door exam session with more specific questions and discussion with the committee. Note: There must be at least two full registered semester sessions (can include summer) between when the

preliminary exam is passed and when the final exam/defense is taken. However, we expect that Preliminary Exams are completed much earlier than this to allow for input and feedback from the Thesis Advisory and Mentoring Committee at an early stage to help improve research question formulation, experimental design and the student's training plan.

Preparing for and Scheduling Your Preliminary Exam:

- Work with your research advisor(s) to formalize and arrange an appropriate thesis advisory/preliminary examining committee.
- Arrange the date and time of your preliminary exam with your research advisor(s) and thesis advisory committee members.
- Schedule an acceptable conference room or classroom in which to hold your prelim.
- Submit the electronic GS Form 8 to officially schedule your prelim exam with the Purdue Graduate School.
- Two weeks prior to your prelim exam, email to smmay@purdue.edu the following information:
 1. Your name
 2. Title of the Thesis Research
 3. Names of Thesis Committee members, with Major Professor designated
 4. Date, time, and place of the final examination
 5. An abstract (no more than 250 words) of the thesis proposal clearly defining the problem and its significance
- The BME graduate office will coordinate the required prelim examination forms with your research advisor(s).

Preparation of the Written Document

The written document for the Prelim Exam will consist of two parts: *The Research Proposal* and *The Training Plan*, both of which are generally designed based on common fellowship proposals. The motivation for requiring both sections, although not all students will pursue formal fellowships, is that the development of both are critical for ensuring that students obtain the research and professional-development training they need to develop into independent researchers who will have a sustained impact on biomedical research. Specific formatting requirements are described below; however, if a student is submitting a formal fellowship or grant proposal, they are encouraged to use that proposal as their prelim document if it covers all of the sections described below and can adequately demonstrate the required competencies listed above. This flexibility in format and length (at discretion of the thesis committee to best support the needs of the student) is allowed to provide the student with the benefit and efficiency in obtaining committee feedback on their actual proposal document; however, additional documents or sections will be required if the proposal does not include all of the BME-required sections (e.g., if a grant proposal does not include a training plan, one must be included in the prelim document). Significant deviations from the default formatting described below should be approved by the Graduate Committee prior to preparation of the prelim documents.

Format Requirements

- Research Proposal of 8-12 pages single spaced (including figures, but not including Abstract, Specific Aims, or Reference sections and additional material); Training Plan of 3-6 pages single spaced (not including CV or optional pages); an unofficial transcript; and Individual Development Plan.

- 11 pt font size or larger. Font must be no more than 15 characters per linear inch (including characters and spaces). At least 0.5-inch margins.
- Reference style in:
 - IEEE, listed and numbered in order of citation, not alphabetically. ([IEEE Overview](#))
 - AMA format, also listed and numbered in order of citation, not alphabetically, but number are cited in text in superscript ([AMA Style](#)),
 - or APA format, cited in text with author, date and listed in bibliography in alphabetical order ([APA Format](#))

Content: Research Proposal

- **Lay-Person Abstract (.5 page, separate page).** Concisely and accurately describe the proposed work, including the research topic and identified gap to be filled, the research question and testable hypothesis to be explored in this work, the research strategy and approach designed to fill the gap, and the significance of the work for the field in both the short- and long-term. This abstract should be written at a level that is understandable to a scientifically literate reader. This abstract will be used to advertise the Prelim exam to the Weldon School and broader Purdue community.
- **Specific Aims Page (1 page max, separate page).** This is the most important page of your proposal, as it serves as both a sales pitch and scientific description of your proposal and why it is important. It is only 1 page, but typically takes the longest time to write – best practice is to iterate numerous times during the preparation of the proposal. The “story” of why your proposal is important and will be impactful on the field must be told in a strongly compelling way on this single page. It should include a statement of a biomedical problem, identification of a gap in current knowledge, and then a suggested research strategy to fill the gap by addressing a specific research question and testable hypothesis. A list of proposed Specific Aims should be described, with just enough detail to convince the reader your plans are well thought out and will be effective. A concluding paragraph should describe the impact this work will have on the field. Also see “[Introduction to the Specific Aims Page of a Grant Proposal](#)” for more guidance on an effective Specific Aims Page. Successful proposals are able to convince the reviewer to support the proposal based on this single page.
- **Significance and Scientific Premise of Proposed Work (~2-3 pages).** Critical analysis and synthesis of the relevant literature on your research topic to establish the current state of the field. Significant scientific gaps must be identified, culminating in a concise and explicit statement of a research question and testable hypothesis. This section should explain the importance of the research problem, and how the proposed work will fill the identified gaps and the resulting impact on the field.
- **Innovation (~.5 page).** This section should briefly describe any innovative aspects of the proposed work, and the significance of this innovation. Innovation can be scientific or technical. Combining two established methods in a way that has never been done can be innovative.
- **Preliminary Data (~2-3 pages).** Relevant (not necessarily all) preliminary data collected by the student should be presented and critically analyzed and interpreted. These data should be used to support the proposed hypotheses and/or demonstrate the feasibility of the proposed work by the student.

- **Research Approach (~3-6 pages).** Describe the general experimental strategy that will be used to test the stated hypothesis and fill the identified gap, and describe its rationale. Describe the specific methodology and procedures to be used in sufficient detail to allow the reader to evaluate the likelihood of success of the proposed work. General methods can be described in their own section before or after the detailed methods for each Specific Aim. For each Aim, describe the exact data to be collected, the planned analyses of the data (including appropriate statistical analyses), and how the data will be interpreted to test your hypothesis/research question. The reader should be convinced that if this work is carried out, that the hypothesis will be tested definitively and ideally that no matter if supported or refuted, the field will be moved forward.
- **Required subsections in Research Approach**
 - **Approaches to Increase Rigor and Reproducibility (0.25-0.5 page).** Briefly describe any approaches you will use to increase rigor, including (if applicable) power analyses to justify number of subjects, randomization and blinding, examination of sex as a biological variable.
 - **Caveats, Potential Problems, and Alternative Approaches (0.25-0.5 page).** Discuss any potential issues you see in the proposed work and how you will address them if they arise.
 - **TimeLine of Proposed Work (0.25 - 0.5 page).** Describe the planned timeline of your proposed work to demonstrate appropriateness of scope. Include expected journal papers to be produced as a result of this work.
 - **References** (does not count for page limit)
- **Additional Documents in the Research Proposal** (do not count for page limit, but are required to ensure ethical and reproducible research).
 - **Data Management and Sharing Plan (required).** Follow NIH or NSF suggestions on approaches to support open science (e.g., data and analysis code sharing).
 - **Vertebrate Animal Section (if applicable).** Follow NIH or NSF formats.
 - **Human Subjects: Inclusion, Protections (if applicable).** Follow NIH or NSF formats.
 - **Authentication of Key Biological and/or Chemical Resources (if applicable).** Follow NIH or NSF formats.
 - Additional proposal pages (not required) can be submitted if the student is preparing a specific fellowship or grant proposal and desires feedback from their committee, e.g.:
 - **Budget**
 - **Facilities and Other Resources**
 - **Equipment**
 - **Biosketch**

Content: Training-Plan

- **Student CV.** In whatever format is most beneficial to the student, given their career plans.
- **Applicant's Background and Goals for Training (3-6 pages).** Include sections on

- 1) Previous Research Experience
 - 2) Career Goals
 - 3) Training Goals and Objectives
 - 4) Activities Planned in Remaining Years of the PhD Training Program (Tables, with rows for various broad categories (e.g., research, coursework, profession development, conferences, paper or dissertation writing, with percentages (%) of time) are useful), and
 - 5) Training and Research Activity Timeline
- (Optional) Additional Training proposal pages may be submitted if the student is preparing a specific fellowship or grant proposal and desires feedback from their committee, e.g.:
 - Training in the Responsible Conduct of Research (RCR)
 - Selection of Mentor and Institution
 - Mentor and Co-Mentor Statements
 - Description of Institutional Environment and Commitment to Training

Content: Other Documents (not included in page limit)

- **Unofficial transcript**
- **Individual Development Plan (IDP).** This must be discussed and signed by your primary advisor in the year the prelim is taken and before distribution to the Preliminary Exam and Mentoring Committee.

Evaluation of the Written Document

The written document is submitted to the committee at least two (2) weeks before the oral prelim defense. Prior to the oral defense, the mentor must pass a complete version of the document through iThenticate to ensure it meets BME and Purdue expectations for original text (documented elsewhere), and indicate the date this was done on their rubric). Based on the expectations in this Overview document and the Committee-Guidance document, all faculty on the committee should provide any significant concerns they intend to raise to the committee Chair (mentor) at least 48 hours prior to the oral defense so that the mentor can compile these and provide to the student at least 1 day prior to the exam. All committee members will provide constructive written feedback via the BME rubric (checkboxes for specific criteria, plus a few bulleted strengths and weaknesses) to the student and mentor after the exam. The Chair will compile all feedback and provide it to all committee members and the BME Graduate Office after the committee meeting. This feedback is ultimately combined with feedback on the oral exam and provided to the student to help them to understand their performance and areas for growth.

Structure of Oral Component: Preliminary Exam and Mentoring Committee Meeting

A roughly two-hour (public for ~1st hour) meeting must be held before the specified deadline date for the semester in which the student has registered to take the Preliminary Exam (Fall/Spring/Summer: last day of the semester)

This meeting will consist of:

1. a ~45 min oral presentation of the material in the written submission (Research and Training Plans)
2. ~15 min questions from the public audience
3. ~20-30 min closed-door discussion on student's research proposal
4. ~15-20 min closed-door discussion on student's training plan
5. ~10 min private discussion among the committee, and completion of group rubric with constructive feedback
6. ~5-10 min discussion with student of rubric feedback

The committee, through questions and discussion, will be responsible for evaluating the student's competencies required for candidacy (listed above):

Overall Feedback and Potential Outcomes of the Preliminary Exam

At the end of the meeting, the committee will discuss privately the student's level of competency in key areas based on both the Written and Oral Components of the Exam. The Chair will complete a group rubric based on this discussion, noting any lack of consensus on the form. The Chair and Committee will then discuss the outcome with the student based on the rubric to ensure everyone is on the same page as to outcomes and next steps. The completed Qualtrics rubric is filed with the BME Graduate Office to ensure appropriate expectations for the Preliminary Exam were applied to the outcome decision (with copies delivered to the student and all committee members).

Possible outcomes (documented by committee on Form 8) are:

- Pass
- No Pass
 - o Student can repeat the whole process (not in the same semester) at a later time as recommended by the committee
 - o Student may not repeat the prelim a third time, without recommendation of the committee and approval from the dean of the Graduate School. In such cases, the student would move to MS thesis option or appropriate alternative program, with guidance and mentoring from BME Grad Program.

Grad Student Research Seminar (BME Bytes)

Rationale

No matter a PhD student's career path, a critical skill to develop is the ability to disseminate their work via oral presentations to a broad audience. The research presentation requirement provides our students with a relatively low-pressure environment to gain experience with conference style presentations to a broad audience, which helps to improve oral presentation skills.

This document provides guidance to both students and faculty for understanding the expected standards of performance for the *third milestone in our PhD Training Program – The Grad*

Student Research Seminar, which consists of an oral presentation that is evaluated by the attendees.

Logistics/Timing

All PhD students will present their research to a wide audience during their third year.

It is not a requirement for the scheduled seminar speakers to register for BME69000 unless they plan to use BME Bytes Seminar to meet a [requirement](#).

Expectations

Students are required to present a 15-20 min conference-style presentation that is well organized and accessible to the breadth of areas within BME. Students receive constructive feedback from all attendees regarding their research, presentation content and style, and ability to address questions.

Fearnot-Laufman-Greatbatch Award

The Fearnot-Laufman-Greatbatch Award will be presented to the student who gives the most outstanding presentation of the academic year. Dr. Neal Fearnot established this award based on his belief and experience that this seminar is a very valuable opportunity for students. The selection is determined by evaluations submitted by faculty, students, and staff in attendance at the seminars. The prize is \$250 (minus taxes), an individual plaque, and the winner's name engraved on a permanent plaque on display in the Martin C. Jischke Hall of Biomedical Engineering.

Defense

Rationale

In order for a student to demonstrate that they have met the independent-research expectations for a PhD, they must defend their work in the public domain. Likewise, they are expected to be able to disseminate their work to the field, and thus must also write a comprehensive dissertation documenting their thesis research. This document is intended to provide a cohesive and comprehensive story of how all of their thesis-research projects fit together to advance the field by filling in existing gaps within the literature regarding a significant research question. This detailed document also often serves as an archive of their work for future students in the lab, and as such is often more detailed than the journal papers that come from this work.

Thesis Advisory and Mentoring Committee Makeup

This follows the same procedure as described in the Preliminary Exam Thesis Advisory and Mentoring Committee Makeup section.

Logistics & Timing

Deciding when a student is ready to defend is a shared decision between the student and faculty research advisor (and thesis mentoring committee) and should be made based on a mutual agreement of when a student has met the requirements for the PhD degree and in alignment with Graduate School policies. *Note: At least two full registered semesters must pass between successful completion of the preliminary exam and when the defense is to be held (includes summer session).* Once agreement is reached, the faculty research advisor must

notify the BME graduate office via e-mail to add the student's name to that semester's candidate list. The Graduate School sets specific deadlines for registering as a candidate for graduation, scheduling the defense and completing the dissertation deposit, which candidates must meet in order to be eligible for graduation. Candidates are strongly encouraged to provide the complete dissertation document to their Thesis Advisory Committee at least two weeks before the scheduled oral defense. Given these stringent timelines, students should identify their applicable deadlines several months before the intended graduation semester.

Preparing for and Scheduling Your Final Exam:

Students are encouraged to attend one of the Thesis / Dissertation Formatting Workshops which are presented by the Purdue Graduate School each semester. While writing your thesis or dissertation, take the following steps:

- Arrange the date and time of your final defense with your research advisor(s) and thesis advisory committee members.
- Schedule an acceptable conference room or classroom in which to hold your final defense.
- Submit the electronic GS Form 8 to officially schedule your final exam with the Purdue Graduate School.
- Two weeks prior to your final exam, email to smmay@purdue.edu the following information:
 1. Your name
 2. Title of the Thesis Research
 3. Names of Thesis Committee members, with Major Professor designated
 4. Date, time, and place of the final examination
 5. An abstract (no more than 350 words) of the thesis proposal clearly defining the problem and its significance
- The BME graduate office will coordinate the required final examination forms with your research advisor(s). Following successful completion of your defense, complete the electronic thesis / dissertation deposit following the steps found on the [Graduate School Thesis / Dissertation](#) website.

Expectations

In their oral defense and written document, students must demonstrate that they have met the BME expectations of PhD graduates including the ability to:

- Critically analyze the literature to identify gaps in a biomedical area
- Design experiments to address these gaps
- Develop and/or use technology to perform these experiments
- Critically analyze, interpret, and disseminate their own data to move the field forward in translationally relevant ways

It is also expected within their defense and dissertation document that students will demonstrate they have carried out their own research by adhering to all principles for responsible conduct of research. There is no set number of published papers required to graduate with a PhD in BME because there are many factors that affect speed of publishing in various areas. A useful goal is to have two published (or accepted) journal papers by the defense, with several more in the pipeline.

Graduation

The table below shows approximate deadlines for steps leading up to graduation with the BME PhD degree. **THESE DATES ARE APPROXIMATE.** You must confirm exact dates with the BME Grad Office and refer to the [Purdue Graduate School Calendar](#).

	TO GRADUATE IN AUGUST	TO GRADUATE IN DECEMBER	TO GRADUATE IN MAY
Plan of Study submission	By end of first spring semester	By end of first spring semester	By end of first spring semester
Qualifying Exam passed	No later than end of second fall semester	No later than end of second fall semester	No later than end of second fall semester
Preliminary Exam passed (plan of study approved, almost all or all courses completed and qual passed)	the last day of the previous year summer term (early August)	the last day of the previous year fall term finals week (mid December)	the last day of the previous year spring term (mid May)
Declare candidacy (faculty advisor email confirmation to BME Grad Office who will enroll student in appropriate CAND course or prepare exam or degree only registration form*)	Upon registration for summer, but no later than first week of June	Upon registration for fall, but no later than second week of September	Upon registration for spring, but no later than second week of February
Schedule Final Oral Defense (via online GS form 8 with all signatures)	At least 15 days prior to proposed defense date	At least 15 days prior to proposed defense date	At least 15 days prior to proposed defense date
Pass Final Oral Defense (via online GS 11 with all signatures)	Mid July	Late November	Mid April
Deposit Thesis	Late July	Early December	Late April

*Students completing degrees between semesters or who plan to defend early in a semester may be eligible for a privileged registration at a reduced fee through “exam only” or “degree only” registrations. Students must be registered for at least one credit in the previous semester to be eligible. Contact the BME Grad Office for more information.

PhD Course Requirements

Enrollment Requirements

BME PhD students are required to register full-time each fall, spring and summer semester. Full-time registration in fall and spring semesters is 8 to 18 credit hours, and in summer sessions is 6 to 9 credit hours. This could be combined course work and research, or just research credits. The combined plan of study course credits and research credits must equal at least 90 credits to meet the PhD degree requirements for graduation.

Core Competency Requirement

- 24 minimum credit hours of graduate (500- & 600-level) course work
 - 24 is a minimum. The student's thesis committee may require additional courses.
 - At least 6 of these core competency credits must be from 600-level courses. Students are encouraged to take these courses on the West Lafayette campus. Exceptions would need to be brought to the Grad Committee for review and approval.
 - For the most part, only 3-credit 500- or 600-level courses count toward the 24 credit hour of core competency requirements. 1- or 2-credit courses are considered on case-by-case basis.
 - Students may choose to take additional courses for their own professional development or as required by their committee.
- 6 cr. hr. [BME](#)
 - BME regulatory courses **cannot** count in this area; only one can count in the other category.
- 6 cr. hr. [Quantitative / Analytical](#)
- 6 cr. hr. [Life Sciences](#)
- 6 cr. hr. [Other Related Graduate Training](#) (only one regulatory course can count and only in this category)
 - Only one of the following regulatory courses can count in this category if you choose to take it:
 - BME 561 Regulatory Preclinical and Clinical Study Design
 - BME 562 Regulatory Approval of Biomedical Devices
 - BME 563 Quality Systems for Regulatory Compliance
 - BME 564 Ethical Engineering of Medical Technologies (Regulatory Affairs and Professional Skills)
- 1 course for writing competency
- **Students must maintain a 3.0 GPA and grades of B- or better are expected for all courses on the plan of study. A maximum of two core competency courses with a grade of C+ / C / C- may be petitioned for approval.**

Additional Academic Requirements

Ethics Requirement

1 credit hour of graduate level ethics (GRAD 61200 or BME 56400)

- This requirement must be fulfilled within first year in PhD program

Seminar Requirement

4 semesters of BME seminar (BME 69000)

Research Requirement

Research credits: Total plan of study courses and research must equal at least 90 credits for graduation.

- You will register for research credits every semester including summer (BME 69900 under your faculty research advisor).
- You must be registered full time for Fall, Spring, and Summer

Research Fundamentals Requirement

2 semesters of a cohort based Qualifying preparatory courses called Research Fundamentals Courses (BME 59500) to be taken in the first year

Transfer Courses

BME PhD students may petition to use up to 12 credit hours of graduate-level course work from one previous master's degree toward their degree requirements, or up to 12 credit hours of graduate-level coursework which has not been applied to another degree, within the following parameters:

- Transfer courses must be 3 credits each with grades of B- or better.
- Both of the 600-level courses required for the BME PhD degree must be taken at Purdue.
- Both of the BME core competency courses required for the BME PhD degree should be taken through the Weldon School of Biomedical Engineering at Purdue.
- Seminar courses and project or independent study courses do not qualify for transfer.

During the first semester of PhD study, students should prepare the [linked petition form](#) and discuss it with their faculty research advisor. Upon agreement, the student and faculty research advisor should sign the petition form and submit it to the BME Graduate Office. The Senior Graduate Program Assistant will review the petition to ensure it meets the requirements of the Purdue Graduate School and, if so, will file the petition for later use during the plan of study submission phase. Any concerns about the petition will be brought back to the student and their faculty advisor in a timely manner.

Dual Degrees

Dual degrees are allowed outside of BME with proper approval from the outside school and your faculty advisor. Pursuing dual BME degrees is not an option. For example, you can not be awarded both a BME Master's and PhD concurrently.

Registering for Classes

[Link to Instructions for How to Register](#)

Electronic Plans of Study

[Link to Instructions for Plan of Study](#)

Minimum Academic Standards

There are several resources available on the website below to help with your academic success. Reach out to someone you trust either in the department or someone else on campus if you feel additional support is needed.

<https://engineering.purdue.edu/BME/AboutUs/DiversityEquityInclusion>

GPA Requirements

To be in good standing with BME and the university, students must maintain a GPA of 3.0 or above for the duration of the program. If your semester and/or your overall GPA falls under a 3.0 or if you receive a letter grade of a C+ or below, you and your faculty advisor will receive an academic notice letter from the BME Grad Office. If your GPA stays below a 3.0 but is above the [university standard](#) for more than 4 semesters (not including summer), you will be dismissed from the program. If you fall below the [universities guidelines](#), you can be dismissed from university prior to the BME 4 semester rule.

Research Grades

- For the first Unsatisfactory (U) in research, grad programs leadership will meet with faculty and student to schedule a mediation meeting.
- If there are two (2) U's consecutively (and no more than three (3) total), student will be dismissed from the program.

Funding Implications

Many financial awards will require you to maintain a GPA of a 3.0 or better to maintain your funding. Therefore, funding may be rescinded before a dismissal from the program occurs. If you have a fellowship or other source of funding (especially outside funding), those resources may have more stringent guidelines. Always refer to your offer or award letter when evaluating your funding status.

If you feel the action taken by the BME Graduate Program is not warranted or if you have extenuating circumstances, you may follow the [policy exception process](#) in this handbook.

Responsible Conduct in Research

All BME and IBSc graduate students must satisfactorily complete the Responsible Conduct of Research requirement before the end of their first semester. This is a two-part requirement.

- Complete the Collaborative Institutional Training Initiative ([CITI online course](#)) on Responsible Conduct of Research Training – Faculty, Postdoctoral, and Graduate Course (CITI-RCR) by the beginning of the first semester of graduate study.
- In addition, a two-hour mandatory workshop is also required: Attend a follow-up seminar or workshop by the end of your first semester. The seminar or workshop will be administered by the graduate school and will allow students to ask questions and discuss RCR-related issues with the speaker ([Link to Graduate workshops](#)).

Changing Major Advisor

See APPENDIX B Student-Advisor Expectation Scales

On occasion, graduate students will need to change major professor / thesis advisor. This change may be student initiated, advisor-initiated, or may result from the advisor leaving the department. Processes and options differ for the three situations and are detailed below. Faculty members and students should review these processes and work together to have clear communication about expectations and needs when working through such a change. The associate head for academic affairs and the Graduate Programs Office staff members should be informed and consulted about any potential changes.

The student's thesis committee can also serve as consultants/mentors who can help guide major advisor and student through inevitable difficult conversations.

Student Initiated Major Advisor Change

Students should be aware that a change in advisor might result in:

- Limited choice of a new advisor, as fewer faculty may be available to accept students.
- Your funding could be at risk and you may need to find alternative funding resources.
- Progression through PhD program milestones and graduation may be delayed.

Students are strongly encouraged to discuss their situation directly with their major thesis advisor as early as possible to attempt to resolve any issues. If such discussions are not satisfactory then the student should engage the members of their thesis advisory committee, another trusted faculty member, Graduate Committee members, the Graduate Committee Chair, or the Associate Head of Academic Programs to assist with negotiations and resolutions, depending upon how far they have progressed in the PhD program (also see *Conflict Resolution Flow Chart*, in Appendix).

If there is concern about confidentiality, the student should clearly ask about confidentiality prior to any conversation. Confidentiality will be maintained within university guidelines. As mandatory Title IX reporters, faculty and departmental staff may be required to report situations to the Purdue Office of Institutional Equity (OIE).

If the student determines, after such consultation and attempts at resolution, that they still desire to find another research group to complete their training, potential new thesis advisors from within BME should then be sought by the student. The student should recognize that the potential new thesis advisor may wish to discuss the situation with the current thesis advisor and other faculty. The potential new thesis advisor should ask for consent from the student prior to contacting the current thesis advisor.

Once a new thesis advisor has been identified the student should write a formal letter to the Graduate Programs Office, requesting a change in advisors, justifying the change, and including confirmation from the new faculty advisor and a statement of understanding from the current thesis advisor.

If a Plan of Study has already been approved, it is the responsibility of the student to discuss with the new advisor any revisions to courses or thesis advisory committee on the Plan of Study and to make the necessary changes in a timely manner.

The student should also initiate a discussion, with both the current and new advisors, as well as the Graduate Programs Office staff, for the timing of transfer of lab and funding. Normal lab checkout procedures will apply to all transfers, including the required cleanup. Research materials including all lab notebooks, samples, equipment, and electronic data is expected to

remain with the original thesis advisor unless other arrangements have been made in writing. Students may request for access or obtain copies of these materials if sanctioned by the original thesis advisor. It is the choice of the original advisor if they will allow the student to include work from their laboratory in the student's thesis or in any public presentation or publication and these requests and decisions should be discussed early and documented immediately in written form.

Advisor Initiated Major Advisor Change

Although rare, when a student is not progressing academically or in research (see *Minimum Academic Standards*), a major professor/thesis advisor may initiate a separation of the student from their lab. The thesis advisor must clearly document and communicate to the student the reasons for the change and allow appropriate time for any needed improvements to meet academic or research standards. Such a change in thesis advisor will typically occur after two "U" grades in research credits or two semesters of substandard academic performance. If the issues leading to the change are long-standing, it is expected that the faculty member would have expressed the issues of concern in writing previously (e.g., involving reference to the *Research Credit Expectations Form*), and warned the student that removal from the group is a possibility. Faculty members must notify the Graduate Programs Office in writing when a student is in process of being removed from their research group. The student has the right and the responsibility to take an active role in seeking a new advisor, with consultation from the Associate Head of Academic Programs, their thesis committee members or other faculty members. No individual faculty member will be obligated to accept a student who has been removed from a different faculty member's research group.

When a new thesis advisor has been identified, the student should write a formal letter to the Graduate Programs Office, requesting a change in advisors, justifying the change, and including confirmation from the current and new faculty advisor. If the Plan of Study has already been approved, it is the responsibility of the student to discuss with the new advisor any revisions to courses or advisory committee on the Plan of Study and to make the necessary changes in a timely manner.

The student should also initiate a discussion, with both the current and new advisors, as well as the Graduate Programs Office staff, for the timing of transfer of lab and funding. Normal lab checkout procedures will apply to all transfers, including the required cleanup. Research materials including all lab notebooks, samples, equipment, and electronic data is expected to remain with the original thesis advisor unless other arrangements have been made in writing. Students may request for access or obtain copies of these materials if sanctioned by the original thesis advisor. It is the choice of the original advisor if they will allow the student to include work from their laboratory in the student's thesis or in any public presentation or publication and these requests and decisions should be discussed early and documented immediately in written form.

Options if Major Advisor Leaves Purdue

There is no formal faculty policy regarding student options when a major advisor leaves Purdue, but the following offers some guidance: There are typically several different options depending on the exact circumstances. Students are encouraged to consult with their thesis committee members and Associate Head for academic affairs to consider options. If the student has not yet completed the Preliminary Exam, they may choose to remain at Purdue and switch to a new advisor, or may explore transfer to the new university with the Major Advisor. In the case of transfer, the Graduate Programs Office staff members can assist in transferring records. If the student has completed the Preliminary Exam, the Graduate School considers them a PhD Candidate, and there are three options:

OPTION 1:

Stay at Purdue, find a new lab with a co-advisor: The professor who is leaving cannot be your only committee chair, but they can be a co-advisor with another BME-faculty member.

OPTION 2:

Stay at Purdue, find a new lab and a new thesis advisor and likely a new thesis project.

OPTION 3:

Move with the Advisor, but graduate with a Purdue PhD: The Graduate School allows PhD candidates to remain as Purdue students while they complete the thesis research at another institution through the “Research-in-Absentia” process. Students following this pathway must file a Research-in-Absentia request (Form GS-12) with the Graduate School, register for BME 69900 every semester (including summer) until graduation. Students will need to add a co-advisor from the BME faculty. Funding guarantees end, and financial support in-absentia should be negotiated with the advisor and the departmental business office. Students should follow Graduate School policy to defend and deposit the dissertation.

Funding Opportunities

There are several ways for students to find funding outside of a Research Assistantship. These additional funding opportunities will help to bolster your CV/Resumes and can help you gain valuable skills during your training.

Teaching Assistantships

BME—For BME teaching assistantships, are nominated by the student’s faculty advisor in Mid-May. Teaching assignments are usually released in Mid-June. If you are interested in being a TA in BME, make sure you let your faculty advisor know so that they can nominate you if they feel it is a good fit.

Outside BME—for any other teaching assignment, you will need to go directly to the school/department you would like to TA for. They should be able to instruct you on their process and if they take students from outside their own fields. We have many students that TA outside of our department for courses in Biology, Chemistry, etc. On occasion, schools/departments will reach out to us in regards to TA’s, if they do that we will share that information with you.

Graduate School Funding Resources

- [Funding Opportunity Databases](#)
- [Resources for Writing Fellowship Applications](#)
- [Fellowship Office](#)

Professional Development Opportunities

BME Resources

- [BMEGSA](#)—The BMEGSA hosts several workshops, speakers and symposiums to help student with their professional development each year.

- Career Coaching—Schedule an appointment with Tammy Siemers for one on one coaching for skills needed in the job search
 - Resume and Job Search
 - Interviewing Skills
 - Job Negotiation
- Weekly Announcements—every Wednesday, there will be weekly announcement sent to students which will compile many of the workshops and opportunities around campus as well as job postings each week.

Career Fairs and Center for Career Opportunities

- The Center for Career Opportunities hosts several opportunities and workshops to strengthen your job search including resume reviews, workshops, career fairs, company information sessions, current job postings etc.
- [CCO Website](#)

College of Engineering Resources

[Website](#)

Computational Engineering Concentration

[Requirements Website](#)

Internships

Internship can be a great way to gain exposure to what industry is like while gaining marketable skill sets and building your network. Regardless if you are interested in a career in industry or academia, an internship adds valuable training to your PhD experience. As a PhD student, the timing of an internship should be discussed with your faculty advisor early to ensure that you aren't missing any important milestones for your lab.

[Internship Instructions](#)

Graduate School Resources

[Website](#)

Regulatory Affairs and Regulatory Science for Medical Devices

[Regulatory Certificate Website](#)

Purdue Graduate Student Government Grants

[PGSG Grant Website](#)

- Childcare
- Equipment Fund
- Student Organization Grant
- Mental Health Partnership Grant
- Professional Grant
- Symposium Grant
- Travel Grant

Student Awards and Recognition

- [College of Engineering Awards](#)

- [Grad School Awards](#)
- BME Awards
 - Dollens Award
 - Lamp Excellence in Teaching Awards

Technology Realization/ Entrepreneurship Programs

Want to learn more about patents, licensing and building a technology start-up company? This seminar course series is focused on the discussion of pertinent issues related to technology innovation and entrepreneurship.

- <https://www.purdue.edu/discoverypark/bdmce/programs/technology-realization-program/index.php>

Teaching Development and Teaching Certificates

- [Innovative Learning Programs](#)
- [College of Engineering Teaching and Learning Certificate](#)

Travel Grants

- [College of Engineering Travel Funds for PhD Candidates](#)
- [Purdue Student Government Travel Grant](#)
- [Graduate School Awarded Grants](#)

Writing Lab

Purdue's award winning Writing Lab offers over 200 free resources including writing and teaching, research, ESL (English as a Second Language), grammar and mechanics, job search, and professional writing assistance.

<https://owl.purdue.edu/>

Petitions to the Graduate Committee

Graduate students are expected to be familiar with all policies and procedures as outlined in the Weldon School of Biomedical Engineering PhD Handbook as well as those of the Purdue University Graduate School and Purdue University as a whole.

Petition for BME Programmatic Exceptions or Appeals

All graduate students have the right to petition for exceptions to any existing BME programmatic policy if they feel that the circumstances warrant special consideration. The student may file a petition with the BME Graduate Committee via Qualtrics appeal form. The petition will be sent to a student's advisory committee or faculty advisor to be approved. If the appeal is approved by the faculty advisor and/or committee, it will then be sent to the Grad Committee or Chair to decide whether or not to accept the appeal.

Petition Deadline: You must submit the appeal in adequate timeframe for the committee to address the concern.

https://purdue.ca1.qualtrics.com/jfe/form/SV_0OHIPsv9a9NVQtU

See ***APPENDIX H: Policy Exception Form***

Student Benefits

[Vacation Policy](#)

[Sick Days](#)

[Family Illness](#)

[Bereavement](#)

[Parental Leave](#)

Medical Insurance

Benefits-Eligible Graduate Student Staff on the West Lafayette campus may be eligible for participation in a medical insurance plan sponsored by the University. Refer to the [Graduate Staff Employment Manual](#) for details.

Spouse Fee Remission

The spouse of a Graduate Student Staff member on the West Lafayette campus is eligible for remission of the amount by which nonresident tuition exceeds resident tuition, but is responsible for all resident tuition and applicable fees. If the Graduate Student Staff member's employment terminates before the end of the sixth week of a semester, or before the date specified by the Office of the Bursar for a summer session, the Graduate Student Staff member's spouse will be responsible for all applicable tuition and fees for that semester or session.

Parking

Graduate Student Staff may be eligible for parking permits not otherwise offered to graduate students. Eligibility varies by campus and is determined by the campus parking authority.

- [Purdue Parking Web Page](#)

Mental Health Resources

- [Purdue's Counseling and Psychological Services \(CAPS\)](#) is available for consultation from 8am - 5pm. Please call 765-494-6995 to speak with a clinician.
- [WellTrack](#) is an online tool to assist students struggling with feelings of anxiety, depression, stress.
- [Office of Graduate Assistance \(OGA\)](#) is available to meet with graduate students and postdocs to provide impartial, independent, and informal assistance. Requests can be sent via gradinfo@purdue.edu or through the [Office of Graduate Assistance Request for Assistance Form](#).
- [The Office of the Dean of Students](#) remains available to assist students during normal office hours (8am-5pm, M-F). No appointment is necessary. You can reach the Office of the Dean of Students by phone at 765-494-1747 or by email at odosmain@purdue.edu. The Office of the Dean of Students is also available for drop-in appointments if you do not have the ability to communicate by phone or email.
- [Health and Wellness Resources](#)

Conflict Resolution Resources

See **APPENDIX I – Conflict Resolution Flow chart**

[Office of Graduate Assistance \(OGA\)](#)

College of Engineering Anonymous Reporting
(https://purdue.ca1.qualtrics.com/jfe/form/SV_3UUxRW5Xmj4NjcV?_ga=2.44282084.1537713518.1689266598-418844285.1688244460)

This form is intended as an avenue for graduate students within engineering to provide feedback at the College level. This tool will enable you to share your thoughts with the Graduate Education team: whether it is an anonymous report on faculty/mentoring issues, other issues you may observe in your school, or ideas that you want to convey to the College of Engineering.

Office of Graduate Assistance (OGA)
<https://www.purdue.edu/gradschool/student/oga/index.html>

Confidentiality and Mandatory Reporting

The BME Graduate Leadership Team will provide impartial and informal assistance with reference to your concerns based on our knowledge of University policy, practice and personnel without judgement.

The information you share during any of our conversations will be handled with the highest degree of confidentiality as possible. Our office may share information about your situation with others on the Graduate Leadership Team to draw on our collective knowledge and experience. We will not share information with others outside our office except in the following circumstances:

- with your express, written consent;
- if required by University policy to report cases of alleged research misconduct to the Research Integrity Office or the Office of the Executive Vice President for Research and Partnerships;
- if required by law to report, such as in cases in which our faculty and staff have a reasonable basis to believe that there is a risk of imminent harm to you or to others or suspected incidents of child abuse or neglect;
- if required by our role as a Title IX mandatory reporter, which requires us to report incidents of sexual discrimination, harassment, assault or exploitation, any other incident of unwelcome sexual conduct, and incidents of relationship violence or stalking.

Diversity and Inclusion

We at the Weldon School of Biomedical Engineering are committed to promoting an inclusive environment that recruits, retains, and celebrates the diverse lived-experiences of our students, postdocs, faculty, and staff and to provide them opportunities and training to excel personally and professionally. As biomedical engineers at Purdue, we are taking intentional steps to act

against all forms of racism, sexism, ableism, xenophobia, transphobia, and other structures of oppression embedded in the fabric of our society. We are fostering a diverse and inclusive environment for students, postdocs, staff, and faculty from all underrepresented and underprivileged groups. We understand that equity is a long-term endeavor and affirm our commitment to sustainable efforts that improve the climate and cultural change within our academic institution.

We will actively strive to educate ourselves on the many different ways that systematic exclusion and inequalities present themselves, to recognize and eradicate exclusionary practices, to call out discrimination when we see it, to humbly learn from our missteps, and to commit to building a safe and equitable climate where our faculty, staff, and students can thrive. We commit to actively celebrating, learning from, promoting, and advocating for the diversity of races, religions, political alignment, colors, ages, national origins and ancestries, genetic backgrounds, marital and parental statuses, sexes and sexual orientations, gender identities and expressions, disabilities, and socioeconomic and veteran statuses that individuals bring to our school. Our mission remains the same:

To be the premier source of scientific discoveries and of well-educated biomedical engineers, fostering strong academic, industrial, and clinical ties, and achieving significant healthcare impact.

Acknowledgement of Indigenous Caretakers

We acknowledge Purdue University is located on the traditional homelands of the Woodland People. We honor and appreciate these indigenous caretakers which include the Bodéwadmik (Potawatomi), Lenape (Delaware), Myaamia (Miami), and Shawnee People.

DEI Initiatives and Additional Resources

[DEI Website](#)

Other Documents and Resources

[Policies and Procedures for Administering Graduate Student Programs](#)

[Graduate School Forms](#)

[Thesis and Dissertation Office](#)

[Graduate Staff Employment Manual](#)

[Graduate School Fellowship Manual](#)

Appendices

- Graduate Research Credit Syllabus
- Student Advisor Expectation Scale
- PhD Milestone Timeline
- Qual Default Milestone Timeline

- Qual Delayed Milestone Timeline
- Qualifying Exam Results Flowchart
- Prelim Exam Timeline
- Policy Exception Form
- Conflict Resolution Flow Chart
- BME PhD Plan of Study Worksheet
- IBSC PhD Plan of Study Worksheet
- MD PHD Plan of Study Worksheet

BME Graduate Research-Credit Syllabus

This form is intended to provide a simple *student-initiated* framework to discuss and document expectations for semester research credits. Discussion and written documentation of expectations is the best practice for providing our students with an outstanding training environment, and is required by the Graduate School for all research credits.

Student Name: _____

Date: _____

Faculty Mentor: _____

Semester/Year: _____

Course Number: _____

Number of Credits: _____

SECTION 1: Trainee Initiated Research Proposal and Research Expectations (*Trainee to Complete*):

1. Please provide a brief description of your proposed research objectives, including any personal goals you have, for this semester.¹

¹ Tip: Set realistic timelines based on previous experiences. Do not overestimate what you can achieve.

2. Please check all expectations that apply for this semester.

Literature Review:

___ Review and critically analyze related literature and document how it relates to the proposed project.

Technology Development:

___ Develop new technology related to the proposed project.

Theory and/or Analysis Development:

___ Develop new hypothesis.

___ Develop new quantitative analyses.

___ Improve existing quantitative analyses.

Data Collection:

___ Collect data in an ethical manner.

___ Maintain detailed, accurate, legible notes in a timely fashion.

___ Submit PACUC or IACUC protocol for data collection.

___ Collect meaningful pilot data for experiment design / technology development.

___ Collect meaningful data for dissemination.

___ Assist other lab members with data collection.

Data Analysis:

___ Conduct data analysis on previously collected data related to the primary subject of the research project

___ Conduct data analysis on data collected this semester

___ Interpret data analysis

___ Produce publication-quality figures documenting data analysis

Presentations:

___ Prepare poster or talk to disseminate your own research findings

___ Contribute to the dissemination of group research findings

Papers:

___ Prepare written dissemination of your own research findings

___ Contribute to the written dissemination of group research findings

Grant proposals and progress reports:

___ Prepare a fellowship or grant application base on your own thesis project

___ Prepare a progress report based on your own thesis project

___ Contribute to a grant proposal from your research group

___ Contribute to a progress report from your research group

Individual Development Plan (IDP)

___ create an IDP and discuss with mentor

___ update your IDP and discuss with mentor

Committee Meetings

___ Hold a Plan of Study committee meeting

___ Hold a Thesis-committee meeting

___ Hold your Prelim Exam

___ Hold a "Green-light for Defense" Thesis Committee meeting

___ Hold your Thesis Defense

Professional Development

- Networking
- Soft skills improvement
- Internship / Partnerships
- Teaching / Mentoring
- Leadership and Management
- Academic Courses

Work Life Balance

- Extracurricular Activities
- Vacation time.² Length and/or approximate dates: _____

Strategies to Improve Goals Achievement Based on Previous Performance:

3. If applicable, evaluate your research performance in the previous semester and analyze how you can improve to accomplish your goals this semester. Discuss your successful strategies, achievements and areas of improvement or areas where you might need help.

4. If applicable, please discuss mentoring/laboratory-management strategies that promote good performance and work environment, as well as areas of improvement, based on your previous experience.

² Students who are fiscal-year employees through the University receive paid leave for all official University holidays and accrue 22 days of paid vacation per fiscal year. For other types of contracts please check the corresponding information.

5. *Please discuss outside activities or strategies (wellness, self care, work life balance) that you engage in to prevent burnout and promote your well being.*

SECTION 2: Faculty Feedback and Comments (Faculty Mentor to Complete):

6. *(Confirm, modify as needed, and/or comment on the above trainee research proposal and expectations. Provide any additional comments on your expectations and suggested trainee goals.*

7. If applicable, discuss strategies to improve goals achievement based on the trainee’s previous performance. Highlight the successful strategies and suggest areas of improvements or alternative strategies.

Mentoring Commitments:

8. Please discuss reasonable expectations based on the needs of the trainee and the availability of the advisor. The recommended **minimum** requirements are to meet once a month, and revise and return documents within 4 weeks.

Regular one-on-one meetings will be held _____ (frequency) to discuss the progression of research. All documents that need revision will be returned on a _____ window on both parts.

9. Please discuss other mentoring commitments if necessary (i.e Group meetings, alternative mentors/mentees, communication strategies, etc.)

Grading

If the trainee’s progress is acceptable based on the expectations noted above for the semester, the trainee will receive a “satisfactory” grade for this term’s research.

If the trainee’s progress is unacceptable based on the expectations noted above, the trainee will receive an “unsatisfactory” grade for this term’s research.

Signatures

Graduate Student: I have discussed research-credit expectations for this semester with my faculty mentor and this form accurately documents these expectations.

_____ (Student Signature)

Date _____

Faculty Mentor: I have discussed research-credit expectations for this semester with this student and this form accurately documents these expectations.

_____ (Faculty Signature)

Date _____

Student-Advisor Expectation Scales

The Student-Advisor Expectation Scales worksheet lists 16 pairs of statements describing end points on a continuum. Individuals differ as to the position they take on each scale. These differences reflect variation in educational philosophy, personality, and the norms of the home discipline. Each item is an issue about which most students and advisors need to reach agreement. Often, however, students and faculty members do not directly discuss their perspectives about how this matter should be resolved and why. In fact, in many cases, the situation may change over the student's time in doctoral studies.

Making expectations explicit, and having regular conversations about expectations, helps to minimize misunderstandings. It is important to recognize that most students do not feel comfortable asking their advisor to complete the worksheet. Faculty members may need to be the ones to initiate conversations about expectations.

This document can provide a basis for conversations between students and advisors to align their expectations. The Expectation Scales worksheet can be used in several ways.

Faculty Advisors

Faculty advisors can complete the worksheet and use it as the basis for a discussion with individual students, among a group of advisees, or with a team in the lab. Students prefer faculty members to initiate discussions.

- For each item, why does the advisor think that this is the best way to proceed?
- Which items are non-negotiable? Which can be discussed and determined together?
- In which ways does the advisor tailor her/his *modus operandi* to the individual student? Why does the faculty member change his/her MO? Does the advisor take into account the student's personality, background experiences, stage in graduate studies, or other factors?
- What other expectations does the advisor have of students? When and how should students ask for clarification of expectations?

Students

Students can complete the worksheet to explore:

- The student's own needs and desires. What does the student think is the best way to proceed for the student's own development?
- What does the student believe and understand to be the advisor's preferences and *modus operandi*?
- Complete the worksheet identifying both what the student desires and the perception of the faculty advisor's position. If the difference is 2 points or more, this is an item that should probably be discussed directly.
- Do all of the faculty member's advisees share similar understandings of the advisor's preferences and *modus operandi*?
- Develop a personal advising philosophy. How would the student plan to advise graduate students in the future? How does the student mentor and advise undergraduates or newer graduate students?

Directors of Graduate Studies

The worksheet can be used with a group of faculty members to initiate discussion about:

- What positions do individual faculty members hold? Why do they think that this is the best way to proceed?
- Does the department have some expectations that are shared?
- Do faculty members share the same reasons or rationale for shared positions on scales?
- When and how do faculty members discuss expectations with student advisees?

Student-Advisor Expectation Scales

Read each of pair of statements describing end points on a continuum. Estimate your position and mark it on the scale. For example, if you believe very strongly that it is the advisor's responsibility to select a research topic for the student, on scale #1 you should circle '1'. If you think that both the advisor and student should be equally involved, circle '3'.

The other side of this document describes ways to use this worksheet.

Course of Study & Dissertation Planning		
1. The advisor should suggest and approve which courses the student takes.	1 2 3 4 5	Students should solely determine which courses they take.
2. It is the advisor's responsibility to select a promising dissertation research topic.	1 2 3 4 5	The student is solely responsible for selecting the dissertation topic.
3. The advisor should select the other members of the dissertation reading committee.	1 2 3 4 5	The student should select the members of the dissertation reading committee.
Contact & Involvement		
4. The advisor should determine how often and when to meet with the student.	1 2 3 4 5	The student should decide how often and when to meet with the advisor.
5. Faculty-student relationships are purely professional and personal matters are not appropriate.	1 2 3 4 5	Close personal relationships are essential for successful advising.
6. The advisor should check regularly that the student is working consistently and on task.	1 2 3 4 5	Students should work independently without having to account for how they spend their time.
7. The advisor should be the first place to turn when the student has problems with the research project.	1 2 3 4 5	Students should try to resolve problems on their own, including seeking input from others, before bringing a research problem to the advisor.
8. The advisor is responsible for providing emotional support and encouragement to the student.	1 2 3 4 5	Emotional support and encouragement are not the responsibility of the advisor – students should look elsewhere.
The Dissertation		
9. The advisor should insist on seeing all drafts of work to ensure that the student is on the right track.	1 2 3 4 5	Students should submit drafts of work only when they want input and feedback from the advisor.
10. The advisor should assist in the writing of the dissertation if necessary.	1 2 3 4 5	The writing of the dissertation should only ever be the student's own work.
11. The advisor should determine when and where to present or publish the research.	1 2 3 4 5	The student should decide when and where to present or publish the research.
12. The advisor should decide when the dissertation is ready to be defended and submitted.	1 2 3 4 5	The student should decide when the dissertation is ready to be defended and submitted.
13. The advisor has direct responsibility for the quality of the dissertation.	1 2 3 4 5	The student bears sole responsibility for the quality of the dissertation.
Support		
14. The advisor is responsible for finding funding for the student until the student graduates.	1 2 3 4 5	Students are responsible for finding their own sources of funding.
15. The advisor is responsible for introducing the student to others in the field, especially at conferences.	1 2 3 4 5	Students are responsible for building their networks in the field.
16. The advisor is responsible for providing career advice and preparation to the student.	1 2 3 4 5	Career advice and preparation are not the responsibility of the advisor – students should look elsewhere.

PhD Milestone Checklist/Timeline

Prior to First Registration: Meet with faculty advisor for advice on courses to take in your first semester.

Every Semester: [Research expectations discussion](#)

Before You Graduate:

- Fulfill BME Seminar Requirements
- Fulfill Writing Requirement
 - Depending on the course you choose, the timing for the writing requirement might be different.
 - If planning on using this course to help learn for the NSF GRFP or learning basic concepts on scientific communication, Year 1 is suggested.
 - If planning on using this course to prepare you for fellowship applications (outside the NSF GRFP) or fellowship applications, Year 2 is suggested.

Year 1

Fall

- Satisfy admission conditions as outlined in your Graduate School admission letter
- Register for Research Fundamentals I Course. The following documents will be due in class but are part of the milestones process.
 - [Qual Pre-Registration Form Due](#) (October 31st)
 - [1st year IDP Due](#) (October 31st)
- Register for a graduate-level ethics class in the first year.

Spring

- Register for Research Fundamentals II Course. The following documents will be due in class but are part of the milestones process.
 - [Qualifying Registration Form Due](#) (February 1st)
- Complete [Qualifying Exam](#) (by May 15th)
- Register for a graduate-level ethics class in the first year.

Summer

- Complete online [plan of study](#) (by June 1st)
- Register for a graduate-level ethics class in the first year.

Year 2

Fall

- Start thinking about your prelim and thesis committee
- Schedule your [prelim](#) in year 2; at the very latest, first semester of year 3
- Complete [2nd year IDP](#)
- Apply for [fellowships](#)

Spring

- Majority of your course work must be complete by prelim.
- Schedule and present your [prelim exam](#); at the very latest, first semester of year 3
- Convene mentoring committee meeting each spring (your prelim can count as your mentoring meeting if completed by spring deadline)

PhD Milestone Checklist/Timeline

Year 3

Fall or Spring (semester TBD): Present your [Research Talk \(BME Bytes\)](#) by signing up for one of the open dates

Years 3-5

- Fulfill BME Seminar requirements
- Fulfill writing requirement
- [Defend Thesis](#)

Fall

- [Complete 3+ year IDP each year](#)

Spring

- Schedule and attend annual mentoring committee meeting

Prior to Final Semester

- Review your plan of study to ensure all degree requirements are met.
- Hold “green light” meeting with your committee for defense
- Review instructions on scheduling your final exam.
- Review Purdue graduation deadlines.

Qualifying Exam Timeline



October 31st

Qualifying Pre-registration form and IDP due



February 1st

Qualifying Exam registration form due



Two Weeks Before Committee Meeting

Deadline to submit written document to your mentoring qualifying committee



Two Days Before Committee Meeting

Deadline for faculty to provide feedback to the mentoring qualifying committee chair



May 15th

Deadline for year one mentoring qualifying meeting (whether Qualifying Exam or not)



June 1st

Electronic plan of study due (whether or not qualifying exam is delayed)

Delayed Qualifying Exam Timeline



June 1st

Electronic plan of study due



September 15th

Qualifying Exam
registration form due



Two Weeks Before Committee Meeting

Deadline to submit written document
to your mentoring qualifying committee



Two Days Before Committee Meeting

Deadline for faculty to provide
feedback to the mentoring qualifying
committee chair



December 20th

Deadline for year one mentoring
qualifying meeting

Qualifying Exam Results

PROVISIONAL PASS

Written Revision:

- 3 weeks after feedback

Oral Exam:

- 2 months after feedback

PASS

Courses can be suggested as needed.

NO PASS

Repeat qualifying exam process in next semester

FAIL

Change to MS option or alternative program with approval

Preliminary examinations must be completed no later than the end of the first semester of the third year of the PhD program.

As soon
as prelim
date is set

- Schedule a conference room
- Make any teleconference arrangements

Minimum
30 days
from
prelim date

- Submit special appointment paperwork with graduate school (for members outside of Purdue)
- Initiate GS Form 8

Two
weeks
prior

- Send prelim documents to committee
 - Research proposal
 - CV
 - Background and training goals
 - Unofficial transcript
 - Individual Development Plan (IDP)
- Send Information to Sandy May (smmay@purdue.edu) for prelim announcement
 - Name
 - Research Title
 - Thesis Committee Members with Major Professor Designated
 - Date, Time and Location of Prelim Exam
 - Abstract (no more that 250 words)



Default Question Block

Appeal/waiver material items are reviewed by the grad committee in the order that they are received.

Deadline: It is advised that you submit your appeal/waiver as early as possible in order for decisions to be made in a timely manner for your request.

Student Information

PUID

Name

Semester for Appeal/Waiver

Year

Student Email

Degree

Program

Nature of your appeal/waiver (include rationale of circumstances leading to request, your plan to improve your performance (if needed) and any other information you believe is relevant. If you have documentation that supports your appeal, you may submit them with your appeal at the end of this form.

Student Statement: I affirm that the information given in this appeal is true and correct and I authorize the BME Graduate Office to verify any information submitted.

SIGN HERE

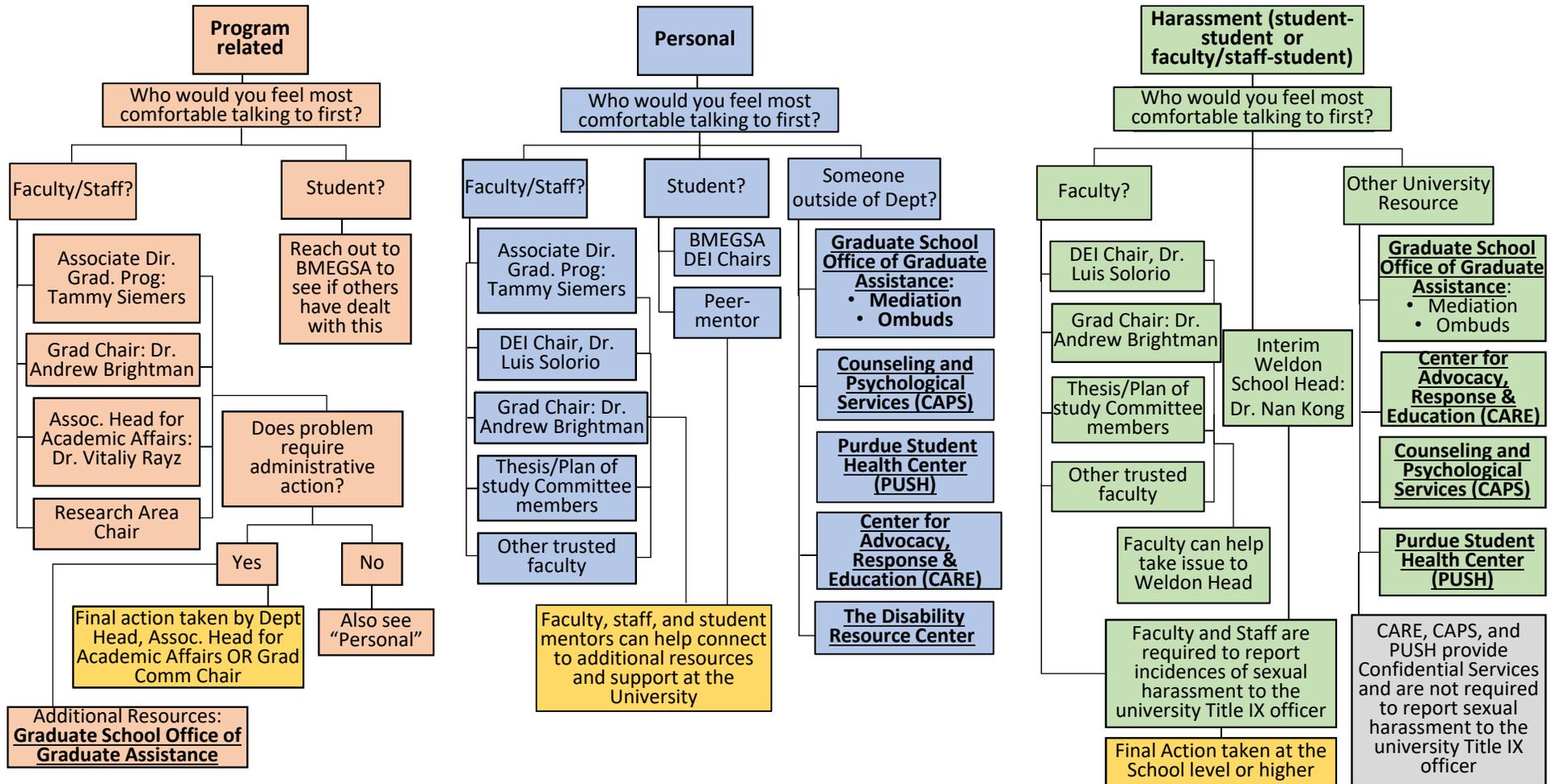
×

clear

Upload any documentation you believe is relevant to your appeal.

Powered by Qualtrics

BME Conflict Resolution Support: Graduate Students



Additional BME DEI Resources available at: <https://engineering.purdue.edu/BME/AboutUs/DiversityEquityInclusion>

Additional details and support for issues with Harassment and Discrimination, Accessibility, and Ethics and Compliance Resources are available through the Office of Institutional Equity: <https://www.purdue.edu/oie/index.php>
(Adapted from Purdue EAPS Conflict support resources example)

Student name: _____

Career Path Focus: _____

Core competency areas

* For transfer courses please place "T" in the appropriate column.

* Students must maintain a 3.0 GPA; all grades must be a B- or better with potentially up to 2 C's allowed at discretion of advisor.

A. Biomedical Engineering (6 credits or equivalency required)

Courses must be BME courses with a technical/quantitative focus. Some non-technical BME courses are not approved for this competency area (see list), but those can often be counted in the Other Related Graduate Training competency area.

<i>These courses can't be transfer courses</i>	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
N/A				
N/A				

B. Life Science (6 credits or equivalency required)

Courses provide graduate training in biology, anatomy, and/or physiology – chosen in consultation with mentoring committee to be most appropriate for each student's research interests.

Transfer?*	Course number	Course title	Credits	Semester (F,Sp,Sum/year)

C. Quantitative/Analytical (6 credits or equivalency required)

Courses provide additional graduate level training in Advanced Math, Numerical Methods, Quantitative Analyses, and/or Data Science – should ideally include at least one course in statistics.

Transfer?*	Course number	Course title	Credits	Semester (F,Sp,Sum/year)

D. Other Related Graduate Training (6 credits or equivalency required)

This area is intentionally flexible to allow students to supplement their didactic training in the most useful way for their individual research and career interests, as decided in consultation with their mentoring committee. See short list of courses that will not count for this area.

Transfer?*	Course number	Course title	Credits	Semester (F,Sp,Sum/year)

E. 600 Level Depth Courses (6 credits or equivalency required; may be the same as courses listed above)

<i>These courses can't be transfer courses</i>	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
N/A				
N/A				

Other Academic Course Requirements (not to be included on your plan of study):

- Research Fundamentals I
- Research Fundamentals II
- Writing Course
- Ethics Course
 - Typically, GRAD 612 taken in the first year
 - Does not count as a 600 level depth course
- 4 BME 690 Seminars to be completed before graduation

Student name: _____

Career Path Focus: _____

Core competency areas

* For transfer courses please place "T" in the appropriate column.

* Students must maintain a 3.0 GPA; all grades must be a B- or better with potentially up to 2 C's allowed at discretion of advisor.

A. Biology/Biochemistry (12 credits or equivalency required)*Courses provide graduate training in biology, anatomy, and/or physiology – chosen in consultation with mentoring committee to be most appropriate for each student's research interests.*

Transfer?*	Course #	Course title	Credits	Semester (F,Sp,Sum/year)

B. Engineering (6 credits or equivalency required)-must be BME courses to receive a BME degree*Courses must be BME courses with a technical/quantitative focus. Some non-technical BME courses are not approved for this competency area (see list).*

<i>These courses can't be transfer courses</i>	Course #	Course title	Credits	Semester (F,Sp,Sum/year)
N/A				
N/A				

C. Quantitative/Analytical (6 credits or equivalency required)*Courses provide additional graduate level training in Advanced Math, Numerical Methods, Quantitative Analyses, and/or Data Science – should ideally include at least one course in statistics.*

Transfer?*	Course #	Course title	Credits	Semester (F,Sp,Sum/year)

D. Ethics Course (Usually GRAD 612) – Does not count for 600 depth course

Course number	Course title	Semester

E. 600 Level Depth Courses (6 credits or equivalency required; may be the same as courses listed above)

<i>These courses can't be transfer courses</i>	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
N/A				
N/A				

Other Academic Course Requirements (not to be included on your plan of study):

- Research Fundamentals I
- Research Fundamental II
- Writing Course
- 2 BME 690 Seminars to be completed before graduation
- 2-BMS 692/CPB 69

Student name: _____

Career Path Focus: _____

Core competency areas

* For transfer courses please place "T" in the appropriate column.

* Students must maintain a 3.0 GPA; all grades must be a B- or better with potentially up to 2 C's allowed at discretion of advisor.

A. Biomedical Engineering (6 credits or equivalency required)

Courses must be BME courses with a technical/quantitative focus. Some non-technical BME courses are not approved for this competency area (see list), but those can often be counted in the Other Related Graduate Training competency area.

<i>These courses can't be transfer courses</i>	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
N/A				
N/A				

B. Life Science (6 credits or equivalency required)

Courses provide graduate training in biology, anatomy, and/or physiology – chosen in consultation with mentoring committee to be most appropriate for each student's research interests.

Transfer?*	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
		6 Credits Waived		

C. Quantitative/Analytical (6 credits or equivalency required)

Courses provide additional graduate level training in Advanced Math, Numerical Methods, Quantitative Analyses, and/or Data Science – should ideally include at least one course in statistics.

Transfer?*	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
		3 Credits Waived		

D. Other Related Graduate Training (6 credits or equivalency required)

This area is intentionally flexible to allow students to supplement their didactic training in the most useful way for their individual research and career interests, as decided in consultation with their mentoring committee. See short list of courses that will not count for this area.

Transfer?*	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
		3 Credits Waived		

E. 600 Level Depth Courses (6 credits or equivalency required; may be the same as courses listed above)

<i>These courses can't be transfer courses</i>	Course number	Course title	Credits	Semester (F,Sp,Sum/year)
N/A		3 Credits Waived		
N/A				

Other Academic Course Requirements (not to be included on your plan of study):

- Research Fundamentals I
- Research Fundamentals II
- Writing Course
- Ethics Course
 - Typically, GRAD 612 taken in the first year
 - Does not count as a 600 level depth course
- 4 BME 690 Seminars to be completed before graduation