

# DOCTOR OF PHILOSOPHY IN BIOMEDICAL ENGINEERING

The doctoral program in the Department of Biomedical Engineering at Texas A&M University is a research-intensive program designed to prepare engineers to enter careers in industry, government, or academia.

## Program Requirements

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### Student's Advisory Committee

After receiving admission to graduate studies, students will consult with the graduate program concerning selection of a chair and members for an advisory committee representative of the student's field(s) of study and research.

The student's advisory committee will consist of no fewer than four members, where the chair or co-chair must be from the student's department (or intercollegiate faculty, if applicable), and at least one or more of the members must have an appointment to a department other than the student's major department. The external member for a student in an interdisciplinary degree program must be from a department different from the chair of the student's advisory committee. The chair, in consultation with the student, will select the remainder of the advisory committee.

Only members of the Graduate Committee Faculty located on Texas A&M University campuses may serve as chair of a student's advisory committee. Other members of the Graduate Committee Faculty – including those located off-campus or outside the university (if permitted by program, department, and college/school policy) – may serve as co-chair or member (but not chair).

The advisory committee as a group – and as individual members – are responsible for advising the student on academic matters. The duties include responsibility for approving the student's proposed degree plan; research proposal; dissertation; and conducting examinations. The advisory committee members' approval of a degree plan indicates their willingness to accept the responsibility for guiding and directing the entire academic program of the student and for initiating all academic actions concerning the student. Additionally, in the case of

academic deficiency, the advisory committee is responsible for initiating recommendations to the Graduate and Professional School.

The chair of the advisory committee, who usually has immediate supervision of the student's degree program, has the responsibility for calling meetings at any time considered desirable.

If the chair of the student's advisory committee is unavailable for an extended period of time in any academic period during which the student is involved in activities relating to an internship, thesis or professional paper – and is registered for courses such as 684, 691, 692, or 693 – the Department Head or intercollegiate faculty Chair may appoint an alternate advisory committee chair during the interim period.

If the chair of a student's advisory committee is on an approved leave of absence – and the student is near completion of the degree and wants the chair to continue to serve in this role – a written request must be submitted to the Associate Provost and Dean of the Graduate and Professional School, by the Department Head or intercollegiate faculty Chair, that the faculty member who is on an approved leave of absence be allowed to continue to serve as chair of the advisory committee – without a co-chair – for up to one year. The request must confirm that the faculty member is able to engage in the required duties as chair during the leave of absence. Extensions beyond the one-year period (if necessary) may be granted with additional approval of the Associate Provost and Dean of the Graduate and Professional School.

If the chair of a student's advisory committee voluntarily separates from the University, and the student is nearing completion of the degree, the chair may continue to serve in this role – at the student's request – for up to one year. Two options are available:

- The chair may continue, with a co-chair, without additional approval by the Graduate and Professional School. The student must select a current member of the Graduate Committee Faculty – from the student's academic program and located near the Texas A&M University campus site – to serve as co-chair of the advisory committee.
- The chair may continue, without a co-chair, with approval by the Graduate and Professional School. A written request must be submitted to the Associate Provost and Dean of the Graduate and Professional School by the Department Head or intercollegiate faculty Chair to allow the faculty member to continue as chair, without a co-chair, of the advisory committee.

For both options, extensions beyond the one-year period (if necessary) may be granted with additional approval of the Associate Provost and Dean of the Graduate and Professional School.

Although individual committee members may be replaced by petition for valid reasons, all members of a student's advisory committee cannot resign *en masse*.

### Degree Plan

The student's advisory committee – in consultation with the student – will evaluate the student's previous education, develop a proposed degree plan, and outline a research problem based upon the student's degree objectives. When completed, as indicated by the dissertation, the degree plan will constitute the basic requirements for the degree.

The degree plan must be created, submitted, and approved through the online Document Processing Submission System (<http://ogsdps.tamu.edu/>) (DPSS). The degree plan must be submitted prior to the deadline imposed by the student's college or school and approved by

the Graduate and Professional School no later than 90 days prior to the preliminary examination.

A degree plan must carry a reasonable amount of 691 (Research).

Additional coursework may be added to the approved degree plan by petition through DPSS, if it is deemed necessary by the student's advisory committee, to correct deficiencies in the student's academic preparation. No changes can be made to the degree plan once the student's Request for Final Examination is approved by the Graduate and Professional School.

Coursework included on the degree plan is subject to the requirements and restrictions detailed in the Credit Requirement and Limitations on Credits and Coursework sections in each degree program page.

Degree program time limits apply to courses listed on a degree plan. Details are available on the Time Limits section in each degree program page.

## Credit Requirements

Students who have completed a master's degree are required to complete a minimum of 64 hours for the Doctor of Philosophy degree. Students who have completed a DDS/DMD, DVM, or MD at an accredited academic institution within the United States are also required to complete a minimum of 64 hours. Students enrolled in an approved combination program which includes a doctoral degree, and in which the doctoral degree will be awarded at the same time as another advanced degree, must complete a minimum of 64 hours. Students enrolled in a master's degree and a doctoral degree simultaneously must have their master's degree awarded before they are eligible to complete a 64-hour doctoral degree.

Students who have completed a baccalaureate degree, but have not completed another advanced degree, must complete a minimum of 96 hours. Completion of a DDS/DMD, DVM, or MD degree at an international institution are also required to complete of a minimum of 96 hours.

A field of study may be primarily in one department or in a combination of departments.

## Limitations on Credits and Coursework

Credit-hour requirements are subject to the following limitations:

1. To receive a graduate degree from Texas A&M University, students must earn one-third or more of the credits through the institution's own direct instruction. This limitation also applies to joint degree programs.
2. Transfer credits may be used toward meeting the credit hour requirements under the following limitations:
  - Courses taken in residence at an accredited United States or international institution (recognized by the Office of Admissions), with a final grade of B or greater, may be considered for transfer credit if – at the time the courses were completed – the courses would be accepted for credit toward a similar degree for a student in degree-seeking status at the host institution.
  - An official transcript from the institution at which transfer coursework was taken must be sent directly to the Office of Admissions. Credit for coursework submitted for transfer from any college or university must be shown in semester credit hours or equated to semester credit hours.

- Grades for courses completed at other institutions are not included in computing the GPA.
  - Coursework in which no formal grades are given, or in which grades other than A or B were earned (for example, CR, P, S, U, H, etc.), is not accepted for transfer credit.
  - Except for officially approved cooperative doctoral programs, credit for thesis or dissertation research – or the equivalent – is not transferable.
  - Courses used toward a degree at another institution may not be applied for transferred graduate credit.
    - Courses used toward a certificate, but not applied to an awarded degree, may be considered for transfer.
    - If the course to be transferred was taken for a certificate or prior to the conferral of a degree at the transfer institution, a letter from the registrar at that institution stating that the course was not applied for credit toward the degree must be submitted to the Graduate and Professional School.
  - Credit for "internship" coursework in any form, or taken by extension, is not transferable.
  - Courses for which transfer credits are sought must be approved by the student's advisory committee and the Graduate and Professional School.
3. Approval to enroll in any professional course should be obtained from the Department Head or intercollegiate faculty Chair (if applicable) in which the course will be offered before including such a course on a degree plan.
  4. A maximum of 9 credit hours of advanced undergraduate courses (400-level) may be considered for application to the degree plan.
  5. No more than 50 percent of the non-research credit hours required for an in-person degree program may be completed through distance education courses.
  6. No credit may be obtained by correspondence study, by extension, or for any course of fewer than three weeks duration.

Some departments may have additional or more restrictive requirements. Exceptions will be permitted only in unusual cases and when petitioned by the student's advisory committee and approved by the Graduate and Professional School.

## Research Proposal

The general field of research to be used for the dissertation should be agreed on by the student and the advisory committee at their first meeting, as a basis for selecting the proper courses to support the proposed research. As soon thereafter as the research project can be outlined in reasonable detail, the dissertation research proposal should be completed. The research proposal should be approved at a meeting of the student's advisory committee, at which time the feasibility of the proposed research and the adequacy of available facilities should be reviewed.

For doctoral students, a Research Proposal should be submitted to the Graduate and Professional School through the Academic Requirements Completion System (ARCS) according to guidelines and deadlines set by the individual academic unit or program and as soon as possible following the completion of formal coursework on a degree plan but no later than 20 working days prior to the submission of the Final Examination Request. Students must have an approved research proposal to be admitted to candidacy.

Compliance issues must be addressed if a graduate student is performing research involving human subjects, animals, infectious biohazards or recombinant DNA. A student engaged in these types of research should check with the Office of Research Compliance and Biosafety at 979-458-1467 to address questions about all research compliance responsibilities. Additional information can also be obtained on the website <http://rcb.tamu.edu> (<http://rcb.tamu.edu/>).

## Examinations

### Preliminary Examination

The student's major department (or chair of the interdisciplinary degree program faculty, if applicable) and their advisory committee may require qualifying, cumulative or other types of examinations at any time deemed desirable. These examinations are entirely at the discretion of the department and the student's advisory committee.

The preliminary examination is required. The preliminary examination for a doctoral student shall be given no earlier than a date at which the student is within 6 credit hours of completion of the formal coursework on the degree plan (i.e., all coursework on the degree plan except 681, 684, 690, 691, 692, 693, 695, 697, 791, or other graduate courses specifically designated as S/U in the course catalog). The student should complete the Preliminary Examination no later than the end of the semester following the completion of the formal coursework on the degree plan.

### Preliminary Examination Format

The objective of preliminary examination is to evaluate whether the student has demonstrated the following qualifications:

1. a mastery of the subject matter of all fields in the program;
2. an adequate knowledge of the literature in these fields and an ability to carry out bibliographical research;
3. an understanding of the research problem and the appropriate methodological approaches.

The format of the preliminary examination shall be determined by the student's department (or interdisciplinary degree program, if applicable) and advisory committee, and communicated to the student in advance of the examination. The exam may consist of a written component, oral component, or combination of written and oral components.

The preliminary exam may be administered by the advisory committee or a departmental committee; herein referred to as the examination committee.

Regardless of exam format, a student will receive an overall preliminary exam result of pass or fail. The department (or interdisciplinary degree program, if applicable) will determine how the overall pass or fail result is determined based on the exam structure and internal department procedures. If the exam is administered by the advisory committee, each advisory committee member will provide a pass or fail evaluation decision.

Only one advisory committee substitution is allowed to provide an evaluation decision for a student's preliminary exam, and it cannot be the committee chair.

If a student is required to take, as a part of the preliminary examination, a written component administered by a department or interdisciplinary degree program, the department or interdisciplinary degree program faculty must:

1. offer the examination at least once every six months. The departmental or interdisciplinary degree program examination should be announced at least 30 days prior to the scheduled examination date.
2. assume the responsibility for marking the examination satisfactory or unsatisfactory, or otherwise graded, and in the case of unsatisfactory, stating specifically the reasons for such a mark.
3. forward the marked examination to the chair of the student's advisory committee within one week after the examination.

### Preliminary Examination Scheduling

Students are eligible for to schedule the preliminary examination in the Academic Requirements Completion System (ARCS) if they meet the following list of eligibility requirements:

- Student is registered at Texas A&M University for a minimum of one semester credit hour in the long semester or summer term during which any component of the preliminary examination is held. If the entire examination is held between semesters, then the student must be registered for the term immediately preceding the examination.
- An approved degree plan is on file with the Graduate and Professional School prior to commencing the first component of the examination.
- Student's cumulative GPA is at least 3.000.
- Student's degree plan GPA is at least 3.000.
- At the end of the semester in which at least the first component of the exam is given, there are no more than 6 hours of coursework remaining on the degree plan (except 681, 684, 690, 691, 692, 693, 695, 697, 791, or other graduate courses specifically designated as S/U in the course catalog). The head of the student's department (or Chair of the Interdisciplinary Degree Program, if applicable) has the authority to approve a waiver of this criterion.

### Preliminary Examination Grading

Credit for the preliminary examination is not transferable in cases where a student changes degree programs after passing a preliminary exam.

If a written component precedes an oral component of the preliminary exam, the chair of the student's examination committee is responsible for making all written examinations available to all members of the committee. A positive evaluation of the preliminary exam by all members of a student's examination committee with at most one dissension is required to pass a student on their preliminary exam.

The student's department will promptly report the results of the Preliminary Examination to the Graduate and Professional School via the Academic Requirements Completion System (ARCS) within 10 working days of completion of the preliminary examination.

If an approved examination committee member substitution (one only) has been made, their approval must be submitted to the Graduate and Professional School via ARCS. The approval of the designated department approver is also required on the request.

After passing the required preliminary oral and written examinations for a doctoral degree, the student must complete the final examination within four years of the semester in which the preliminary exam is taken. Exams taken in between terms will expire at the end of the term that ended prior to the exam. For example, a preliminary exam taken and passed during the Fall 2023 semester will expire at the end of the Fall 2027 semester. A

preliminary exam taken in the time between the Summer and Fall 2023 semesters will expire at the end of the Summer 2027 semester.

## **Failure of the Preliminary Examination**

### **First Failure**

Upon approval of a student's examination committee (with no more than one member dissenting), and approval of the Department and Graduate and Professional School, a student who has failed a preliminary examination may be given one re-examination. In accordance with Student Rule 12.5, the student's department head or designee, intercollegiate faculty, or graduate advisory committee should make a recommendation to the student regarding their scholastic deficiency.

### **Second Failure**

Upon failing the preliminary exam twice in a doctoral program, a student is no longer eligible to continue to pursue the PhD in that program/major. In accordance with Student Rule 12.5.3 and/or 12.5.4, the student will be notified of the action being taken by the department as a result of the second failure of the preliminary examination.

### **Retake of Failed Preliminary Examination**

Adequate time must be given to permit a student to address inadequacies emerging from the first preliminary examination. The examination committee must agree upon and communicate to the student, in writing, an adequate time-frame from the first examination (normally six months) to retest, as well as a detailed explanation of the inadequacies emerging from the examination. The student and committee should jointly negotiate a mutually acceptable date for this retest. When providing feedback on inadequacies, the committee should clearly document expected improvements that the student must be able to exhibit in order to retake the exam. The examination committee will document and communicate the time-frame and feedback within 10 working days of the exam that was not passed.

### **Final Examination**

Candidates for the doctoral degrees must pass a final examination by deadline dates announced in the Graduate and Professional School Calendar (<https://grad.tamu.edu/knowledge-center/dates-and-deadlines/dates-and-deadlines/>) each semester. A doctoral student is allowed only one opportunity to take the final examination.

No unabsolved grades of D, F, or U for any course can be listed on the degree plan. The student must be registered for any remaining hours of 681, 684, 690, 691, 692, 791 or other graduate courses specifically designated as S/U in the course catalog during the semester of the final exam. No student may be given a final examination until they have been admitted to candidacy and their current official cumulative and degree plan GPAs are 3.00 or better.

Refer to the Admission to Candidacy (<https://catalog.tamu.edu/graduate/academic-expectations-general-degree-requirements/#degreerequirementstext>) section of the graduate catalog for candidacy requirements.

A request to schedule the final examination must be submitted to the Graduate and Professional School via ARCS a minimum of 10 working days in advance of the scheduled date. Any changes to the degree plan must be approved by the Graduate and Professional School prior to the submission of the request for final examination.

The student's advisory committee will conduct this examination. Only one committee member substitution is allowed with the approval of the Graduate and Professional School. If the substitution is for the sole external member of the advisory committee - with an appointment to

a department other than the student's major department - then the substitute must also be external to the student's major department. In extenuating circumstances, with the approval of the Graduate and Professional School, an exception to this requirement may be granted.

The final examination is not to be administered until the dissertation or record of study is available in substantially final form to the student's advisory committee, and all concerned have had adequate time to review the document. Whereas the final examination may cover the broad field of the candidate's training, it is presumed that the major portion of the time will be devoted to the dissertation and closely allied topics. Persons other than members of the graduate faculty may, with mutual consent of the candidate and the chair of the advisory committee, be invited to attend a final examination for an advanced degree. A positive vote by all members of the graduate committee with at most one dissension is required to pass a student on their exam. A department can have a stricter requirement provided there is consistency within all degree programs within a department. Upon completion of the questioning of the candidate, all visitors must excuse themselves from the proceedings.

### **Final Examination Grading**

The student's department will promptly report the results of the Final Examination to the Graduate and Professional School via the Academic Requirements Completion System (ARCS) within 10 working days of completion of the final examination. The Graduate and Professional School will be automatically notified via ARCS of any cancellations.

A positive evaluation of the final exam by all members of a student's advisory committee with at most one dissension is required to pass a student on their final exam. If an approved committee member substitution (1 only) has been made, their approval must be submitted to the Graduate and Professional School via ARCS.

### **Dissertation**

The dissertation, which must be a candidate's original work demonstrates the ability to perform independent research. Whereas acceptance of the dissertation is based primarily on its scholarly merit, it must also exhibit creditable literary workmanship. Dissertation formatting must be acceptable to the Graduate and Professional School as outlined in the Guidelines for Theses, Dissertations, and Records of Study.

After successful defense and approval by the student's advisory committee and the head of the student's major department (or chair of intercollegiate faculty, if applicable), a student must submit the dissertation in electronic format as a single PDF file to <https://etd.tamu.edu/>. Additionally, a dissertation approval form with original signatures must be received by the Graduate and Professional School through the Academic Requirements Completion System (ARCS). Both the PDF file and the completed ARCS approval form must be received by the deadline.

Deadline dates for submitting are announced each semester or summer term in the Graduate and Professional School Calendar (see Time Limit statement). These dates also can be accessed via the Graduate and Professional School website (<https://grad.tamu.edu/>).

Each student who submits a document for review is assessed a one-time thesis/dissertation processing fee through Student Business Services. This processing fee is for the thesis/dissertation services provided. After commencement, dissertations are digitally stored and made available through the Texas A&M Libraries.

A dissertation that is deemed unacceptable by the Graduate and Professional School because of excessive corrections will be returned to

the student's department head or chair of the intercollegiate faculty. The manuscript must be resubmitted as a new document, and the entire review process must begin anew. All original submittal deadlines must be met during the resubmittal process to graduate.