I. Introduction

This document presents procedures and criteria for the Ph.D. degree in mechanical engineering at Texas Tech University. The new rules supersede the rules described in ME Graduate Student Handbook (revised Spring 2012) in the section titled "Ph.D. Degree Requirements." The new regulations will apply to students that have joined our Ph.D. Program after May 31, 2014.

The aim of the changes is to ensure that our students (i) get rigorous education in fundamentals of mechanical engineering through classroom courses and related activities, and (ii) develop their creativity, gain research competence, and acquire professional skills by engaging in Ph.D. investigations that would result in a Ph.D. dissertation based on the student's original research contribution.

II. Coursework Requirements

1. Required coursework

   • ME Ph.D. students are required to take at least 12 graduate lecture courses (36 credit hours).
   • There is a minimum of 6 ME courses; students may take courses outside of ME, but the courses selected must have a significant science component and be approved by the student’s Ph.D. Advisor.
   • In the first two semesters students are required to take two math courses and two core courses in their specialization area.
   • To be in good standing, a student must maintain at least 3.25 grade point average, excluding research courses.

2. Course transfers

   • All graduate level credits of a TTU student transferring from the ME master's program to the ME Ph.D. program can be applied towards his/her Ph.D. degree.
   • A maximum of 6 graduate level courses can be transferred from the prior master’s degree outside of ME Department at TTU. Graduate Director will make decision regarding the transfer, based on the course content and quality.
   • Ph.D. students who transfer from another program when their Advisor joins the ME faculty at TTU will have transfer credits evaluated by the Graduate Director on an individual basis.

3. Graduate Seminar

   • In the first semester of enrollment graduate students must register for 1 credit hour of the course ME 5120 "Graduate Seminar."
• Students register for ME 5120 only once. However, to receive credit at the end of their graduate studies, Ph.D. students have to attend 10 seminars every full semester (excluding summer sessions).

4. Academic regulations

• Graduate School requires that Ph.D. students take at least 60 credit hours of graduate level coursework and research. To satisfy this requirement, ME Ph.D. students will take lecture courses (as specified above) in combination with ME 7000 "Research" courses. (There is no ME 6331 course.)
• It is also required that Ph.D. students take at least 12 credit hours of ME 8000 “Doctor's Dissertation.” Students should enroll into ME 8000 after the ME coursework requirements and the 60-credit-hour rule have been satisfied.

III. Research Requirements

The student’s research is the primary driver of the Ph.D. program and will typically begin in the first semester. Research should be conducted under direct supervision of the Ph.D. Advisor and evaluated by the Ph.D. Committee. Ph.D. investigations can include experimental, computational, and/or theoretical work that would result in development of skills and expertise in a specific engineering sub-discipline. Students must learn to formulate hypotheses, develop experimental/numerical/theoretical protocols, critically analyze and evaluate results obtained, synthesize and interpret data, and succinctly present outcomes. Upon completion of their Ph.D. degree students should be able to work as independent researchers in academia or industry.

• The Ph.D. dissertation presents the results of original and significant research work conducted by the student under the supervision of the Ph.D. Advisor and Ph.D. Committee.
• Based on the research performed, at least one publication in a peer-reviewed, archival journal indexed in Scopus or Web of Science is required.
• At least one presentation of the research results at a national/international technical conference (oral or poster) or a graduate seminar presentation at the ME Department is also required.

IV. Ph.D. Advisor and Ph.D. Committee

1. Faculty Acting as the Ph.D. Advisor of a Student

Students that do not have an assigned Ph.D. Advisor upon joining the Ph.D. program should become acquainted with the faculty to search for an advisor. Finding a Ph.D. advisor by the end of the first semester is the student's responsibility. This choice must be mutually agreed upon, based on the area of research interests and available positions.

• A Ph.D. Advisor will
  o guide the student in the selection of courses
  o supervise the selection of a dissertation research topic and preparation of the Qualifying Proposal
  o mentor the student in his/her research
monitor the research progress and notify the student and the Graduate Director if the progress is insufficient.
- evaluate the doctoral research to ensure that the novelty and intellectual value of the Ph.D. thesis project results in at least one publication in a peer-reviewed journal.

Changing of advisors is not recommended. If a student has problems with his/her advisor, he/she should talk to the Graduate Director who can refer the matter to the ME Graduate Committee.

2. Student's Ph.D. Committee

Each Ph.D. student must have a Ph.D. Committee to assist with academic matters. The Ph.D. Committee should be selected during the second semester of the Ph.D. studies.

- The Committee assesses the student's yearly progress and votes to pass or fail the student in the Qualifying Exam and in the Thesis Defense.
- Each Committee member has a veto power. A negative vote will immediately trigger a review by the Graduate Director, the ME Graduate Committee, and Department Chair.

The Ph.D. Committee is required to:

- have a minimum of four members who are graduate faculty at TTU (additional members can be added if requested by the Ph.D. Advisor);
- be chaired by the Ph.D. Advisor from Mechanical Engineering Department at TTU;
- include at least two faculty (in addition to the Ph.D. Advisor) from Mechanical Engineering Department at TTU;
- include at least one member from outside the Mechanical Engineering Department at TTU.

The initial selection and any subsequent change in the Committee must be approved by the Ph.D. Advisor and the Graduate Director.

V. Degree Plan, Exams and Yearly Progress Reports

1. Degree Plan

All Ph.D. students must submit the "Program for the Doctoral Degree" form (i.e., Degree Plan) to the Graduate School. The following rules will be observed:

- Degree Plan is made with the guidance of the Ph.D. Advisor in the first year.
- Once approved, the courses listed on this form become the official program of study.
- Justified deviations from the program of study can be approved.
- The Ph.D. degree will be awarded only if all requirements of the Degree Plan and the requirements laid out in this document have been met.
2. Preliminary Exam

Implementation of the Preliminary Exam in the first year of studies is anticipated. Students that joined the Ph.D. program in the Summer 2014 or Fall 2014 will be informed by the end of the 2014 Fall semester if this rule will apply to them.

3. Yearly Progress Report

The student is required to write a yearly Progress Report and meet with the Ph.D. Committee annually to obtain the Committee approval of his/her progress. The Progress Reports and Committee Evaluations should be completed each year by June 15. These documents will become part of the student's record maintained by the Department.

4. Qualifying Thesis Proposal and Qualifying Exam

The Qualifying Thesis Proposal for Admission to Candidacy will occur within the third year. The following topics should be described in separate sections of the Proposal:

- student’s thesis research that was performed prior to the Proposal;
- independent work on an additional research project defined by the student’s Ph.D. Advisor (the Advisor is required to give this problem to the student six weeks prior to the Proposal due date).

The student will be required to pass an oral Qualifying Exam based on his/her written Qualifying Thesis Proposal. This exam will be administered by the student’s Ph.D. Committee, and the following rules will apply:

- If the student's performance is unsatisfactory, the exam may be retaken within four to six months.
- The student may be asked by the Committee to provide a revised version of the Qualifying Thesis Proposal as a condition for passing the exam.
- The Qualifying Thesis Proposal becomes part of the student’s record maintained by the Department.

5. Dissertation and Public Defense

Ph.D. dissertation (based on the student’s original research contribution) and Public Defense are required of every doctoral candidate.

- Ph.D. Dissertation will be submitted to the Ph.D. Committee at least three weeks before the Public Defense.
- Public Defense must be publicly announced two weeks in advance.
  - The Graduate School requires three weeks’ notification.
- The Ph.D. Committee and the Graduate Dean Representative conduct the Public Defense.
- All members of the Ph.D. Committee cast a vote.
- Within a week from the Public Defense, all members of the Ph.D. Committee will provide the Graduate Director with a written assessment identifying key strengths and weak-
nesses of the Ph.D. Dissertation. These assessments will be part of the student’s record maintained by the Department.

- After the written assessments have been provided by all the Committee members and the report has been approved by the Graduate Director and the Department Chair, the Chair of the Ph.D. Committee will notify the Graduate School about the results.

**VI. Concluding Remarks**

Ph.D. students are responsible for fulfilling the requirements of their degree. All official forms sent to the Graduate School must first be approved by the Graduate Director.

The ME department will maintain a database of Ph.D. dissertations along with peer-reviewed publications (indexed in Scopus or Web of Science) resulting from each student's Ph.D. investigations. Joint papers published by the student and his/her Advisor after the Ph.D. degree has been completed will also be included when the relevant information is provided by the student and/or student's Ph.D. Advisor.

Timeline of a typical Ph.D. degree in Mechanical Engineering:

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