Ph.D. Qualifying Exam Procedures

1. Objectives of the Ph.D. Qualifying Exam

The objective of the Qualifying Exam (QE) in the Department of Materials Science and Engineering (MSEN) is to test the candidate’s intellectual maturity and fundamental knowledge and understanding of materials science and engineering.

The QE will serve as an indicator of the candidate’s ability to continue the Ph.D. dissertation work and carry out research independently in a chosen field of study. An important component of the examination is evaluating the capability for critical and creative thinking, the ability to summarize and critically assess a large body of the literature and the ability to propose cutting-edge research to fill gaps in knowledge related to the selected topic.

Doctoral students who are in the two semester Qualifying Exam process are called Qualifying Exam Candidates.

2. General requirements for Ph.D. Qualifying Exam

All MSEN students pursuing the Ph.D. degree, with or without a prior M.S. degree, are required to pass the QE to be eligible to continue their Ph.D. work. Students should take QE for the first time by the end of their third 15-week semester (Spring or Fall semesters) in the MSEN Ph.D. program. The qualifying exam is offered during Fall and Spring semesters only. Three or more of the following courses must be completed: MSEN 601, MSEN 603, MSEN 640, MSEN 620, and/or MSEN 602.

Students who are on probation by the MSEN QE Request submission deadline (established through the MSEN Graduate Program) are not eligible to take the QE.

3. Format of the Ph.D. Qualifying Exam

The MSEN qualifying exam consists of:

(1) Ph.D. Qualifying Exam Paper - a written focused literature review with critical analysis of a specific topic, not directly connected to the candidate's Ph.D. thesis topic (for more details see Section 9.1);

(2) Oral Ph.D. Qualifying Exam consisting of a presentation and defense of the Ph.D. Qualifying Exam Report (for more details see Section 9.2). Students must demonstrate basic knowledge of fundamental materials science and engineering concepts related to the written report.

Ph.D. Qualifying Exam Report and Oral Ph.D. Qualifying Exam are evaluated by the Ph.D. Examination Committee appointed by the Chair of the MSEN Ph.D. Examination Committee for each candidate. (See Section 6 for more details).
4. Timelines of Ph.D. Qualifying Exams

Summary of the important dates for Ph.D. QE is provided in Table 1 below:

<table>
<thead>
<tr>
<th>Event</th>
<th>Timeline</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td>Submitting request for QE to the MSEN Graduate Program Office</td>
<td>Min. 12 weeks before first day of classes</td>
<td>Before June 3, 2019</td>
<td>Before October 21, 2019</td>
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<tr>
<td>QE Orientation</td>
<td>Min. 12 weeks before first day of classes</td>
<td>Before June 3, 2019</td>
<td>Before October 21, 2019</td>
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<tr>
<td>Appointing Examination Committee for each candidate</td>
<td>10 weeks before first day of classes</td>
<td>June 17, 2019</td>
<td>November 4, 2019</td>
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<tr>
<td>Sending three QE topic to QE candidates</td>
<td>8 weeks before first day of classes</td>
<td>July 1, 2019</td>
<td>November 18, 2019</td>
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<tr>
<td>Candidate's confirmation of the selected topic</td>
<td>7 weeks before first day of classes</td>
<td>July 8, 2019</td>
<td>November 25, 2019</td>
</tr>
<tr>
<td>Deadline for submitting Ph.D. Qualifying Exam Report</td>
<td>Wednesday before first week of classes</td>
<td>August 21, 2019</td>
<td>January 13, 2020</td>
</tr>
<tr>
<td>Oral Ph.D. Qualifying Exams</td>
<td>1st week of classes</td>
<td>Aug. 29 - Sept. 1, 2019</td>
<td>January 16-18, 2020</td>
</tr>
<tr>
<td>Deadline for submitting final version of Qualifying Exam Committee reports to the MSEN Graduate Program Office (Conditional Requirements)</td>
<td>By 7th week of classes</td>
<td>October 14, 2019</td>
<td>March 2, 2020</td>
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</table>

5. Request for Qualifying Exam

Before the start of each QE cycle in Spring or Fall semester, the MSEN Graduate Program Advisor notifies the candidates who must take the exam that semester.

To register for the Ph.D. qualifying exam, students will provide the MSEN Graduate Program Advisor with an electronic version of the completed application form (by deadlines provided in Table 1). This form can be found on [http://engineering.tamu.edu/media/2435613/qe-application-request.pdf](http://engineering.tamu.edu/media/2435613/qe-application-request.pdf). The application includes the following: the name of the candidate, the name of the candidate's advisor (if applicable), degrees received, unofficial transcript, degree plan (if submitted and approved), current dissertation topic, a 300-500 word abstract of current dissertation research. Candidates who have earned a Master of Science degree must also provide a 300-500 word abstract of their MS thesis.
This information is used by the Examination Committee to suggest and assign the topic for the written portion of the qualifying exam (see Section 6 for more details).

In cases where students do not have an academic advisor or have otherwise not begun their dissertation research, the candidate should provide a 300-500 word general synopsis of their past and anticipated research area (thereby providing the Examination Committee the information to assign an appropriate topic).

Students who need special accommodation should provide recordation letter from the Disability services with their QE application. The Graduate Program Advisor and the Chair of the MSEN Ph.D. Examination Committee will then work together to meet special accommodation requirements.

6. **Qualifying Exam Orientation**

At the beginning of each QE’s cycle (see Table 1 for more detail), all Qualifying Exam Candidates are required to attend the orientation session provided by the Graduate Program Director and Chair of the MSEN Ph.D. Examination Committee. This session will explain the procedures for the MSEN Ph.D. qualifying exam and answer questions.

7. **Qualifying Exam Committee**

The Examination Committee consists of three MSEN faculty members assigned to each QE candidate by the Chair of MSEN Ph.D. Examination Committee, no later than 10 weeks before beginning of the semester in which QE will be taken (see Table 1 for more details). The exam committee is composed of three MSEN faculty members. Two of the committee members must be non-zero full-time equivalent MSEN faculty. In other words, these members are either:

- Full [http://engineering.tamu.edu/materials/people/faculty](http://engineering.tamu.edu/materials/people/faculty) OR,
- Joint [http://engineering.tamu.edu/materials/people/joint-faculty](http://engineering.tamu.edu/materials/people/joint-faculty) MSEN faculty.
- One committee member may be an affiliated MSEN faculty.

One member of each Examination Committee serves as a chair and is responsible for ensuring the integrity of the exam is maintained and all components of the exam are completed.

The candidate’s faculty advisor/s cannot be a member of the Examination Committee. They also cannot attend the oral exam or interfere with examination process at any instance.

The MSEN Graduate Program Office sends the QE registration form to each member of the qualifying exam committee and the candidate. The candidate’s academic advisor(s) is (are) included in this communication.
8. **Topic of the Qualifying Exam – Selection process**

Members of the Examination Committees for each QE candidate suggest three (3) QE topics with a short (100-200 words) description of each topic. Topics must be outside of the candidate's dissertation topic but complements doctoral coursework and general area of research. Each committee member must suggest one (1) topic and cannot merely "agree" with a topic suggested by another committee member. The topics should be e-mailed to the Graduate Program Advisor. *If a committee member fails to provide a topic on time, Chair of the student's QE Examination Committee must provide the topic on behalf of the committee member.*

Eight weeks before the 1st day of classes in Fall and Spring semesters (see Table 1 for more details), the Graduate Program Advisor informs QE candidate’s faculty advisor, chair of MSEN Ph.D. Examination Committee and Graduate Program Director about suggested topics for QE by e-mail.

Within seven (7) days after the topics are emailed, (see Table 1 for more details), the candidate selects a topic and e-mails the selection to the Examination Committee, Chair of the MSEN Ph.D. Examination Committee and the Graduate Program Advisor. If no topic choice is received, the student will not be allowed to take the QE.

9. **Format of the Exam**

9.1 **Ph.D. Qualifying Exam Paper**

The written review is composed of a rigorous literature review of the selected topic with the emphasis on critical analysis and identification of key outstanding issues and/or research opportunities. The candidate is expected to propose ideas on how to address these issues and/or exploit the opportunities in future or suggest and discuss possible future research directions.

The paper must be prepared and written by the candidate independently and individually. All Ph.D. Qualifying Exam Papers will be submitted via e-mail to the members of the candidate’s Examination Committee, Chair of the Departmental Committee and Graduate Program Advisor, a week before the first week of classes in the semester (see Table 1 for more details) by 5pm.

Qualifying Exam Papers submitted after the deadline will not be evaluated by Examination Committees. Student/s will fail the Qualifying Exam.

In the case of doctor documented sickness, university-related travels, death in the family and other cases of university accepted excuses, an extension of submission deadline can be granted by the chair of the MSEN Ph.D. Examination Committee based on the candidate’s request and completion of all required documentation according to University Student Rules on Attendance Section 7.0.

All Ph.D. Qualifying Exam Papers will be checked for plagiarism before being evaluated by Examination Committee. Any sequence of 15 or more words identical to a cited references or any other published or available online literature will be considered plagiarism. The Examination Committee will not evaluate plagiarized Ph.D. Qualifying Exam Papers and will immediately report the violation to the Aggie Honor Code Office for processing.
**Paper Format**

**General**
- contains 5000-7000 words, including abstract, table and figure captions, and excluding references.
- no more than twenty (20) tables, figures, schematics, or other graphics. These items must be appropriately referenced and cited with sources.
- use 12 pt. Times New Roman font with 1.5 line spacing and 1” margins.

- **Cover page** – the name of the Department, Title of the paper (topic), Ph.D. Qualifying Exam Paper, the candidate (author) name, members of the committee, date;

- **Abstract**: 300-500 words abstract with short description of Ph.D. Qualifying Exam Paper.

- **Introduction** (approximately 25% of the paper) – provide an introduction to the selected topic with a brief review of the fundamental concepts and scientific issues related to the topic. State clear objectives and address the importance of selected research topic.

- **Critical Analysis** *(approximately 50% of the paper)* – provide a thorough and critical literature review of the selected topic. The critical analysis does not mean to criticize in a negative manner. Rather, the analysis requires the writer to question the information and opinions published and present the writer’s evaluation of the material. A critical analysis provides an informed evaluation about the usefulness, importance, significance, validity and current research status of your topic. Generally, the critical analysis is organized in three sections;
  - address individual scientific issues,
  - address fundamental concepts and published theories. Clearly demonstrate knowledge of the fundamental concepts required for understanding the current state of the research in the field.
  - address the writer’s reflections and individual assessment of the most current literature.
  - **NOTE**: avoid a superficial, brief review of the large number of papers addressing different issues related to the selected topic.

- **Conclusions and Future work** *(approximately 25% of the paper)* – clearly identify crucial scientific issues and propose ways to resolve them using available scientific methodology. Does the subject matter have contemporary relevance? What are the strengths and weaknesses of the topic, methodology and evidence?

- **References** - The number of cited references ought to be between 30 and 60. Indicate references by number(s) in square brackets in line with the text. The actual authors can be referred too, but the reference number(s) must always be given. **Please include all author names and article titles of all cited articles** using the following formats:
9.2 Oral Defense of the Ph.D. Qualifying Exam Paper

The paper will be presented and defended by the candidate to the Examination Committee. The presentation should consist of no more than 35 Powerpoint slides. During or after the presentation, the Examination Committee will ask questions not only regarding the paper and presentation but also exploring the candidate’s fundamental materials science and engineering knowledge needed for in-depth understanding of scientific issues, concepts and theories related to the selected topic. This oral defense component is expected to be 45-60 minutes. (Times noted are at the discretion of the committee)

The designated chair of the Examination Committee is responsible for ensuring the integrity of the exam is maintained and all components of the exam are completed.

10. Evaluation of the Exam and Qualifying Exam Report

Three members of the qualifying Examination Committee will decide whether the candidate has passed or failed QE by a vote. The voting takes place immediately following the oral presentation and in the absence of the candidate. When appropriate, the committee may vote for a conditional pass. Possible voting results are summarized in Table 2 below.

Table 2: Possible voting results of the Examination Committee

<table>
<thead>
<tr>
<th>Member 1</th>
<th>P</th>
<th>P</th>
<th>P</th>
<th>CP</th>
<th>CP</th>
<th>CP</th>
<th>F</th>
<th>F</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member 2</td>
<td>P</td>
<td>P</td>
<td>CP</td>
<td>CP</td>
<td>CP</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>P</td>
</tr>
<tr>
<td>Member 3</td>
<td>P</td>
<td>CP</td>
<td>CP</td>
<td>CP</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td><strong>Final outcome</strong></td>
<td>P</td>
<td>P</td>
<td>CP</td>
<td>CP</td>
<td>CP</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>CP</td>
</tr>
</tbody>
</table>

P - Passed, CP – Conditional Pass, F – Failed

All members of the Examination Committee indicate their vote (F, P, or CP), sign an evaluation form (QE report) and the Chair Examination Committee returns the completed form to the MSEN Program office immediately after the defense. A letter (or email) of the QE Results Report will be sent to the candidate by the Chair of the Examination Committee.
QE Results Reports can have the following outcomes:

- **Pass QE** – suggestions and recommendations for further improvements, if any.
- **Conditional pass of QE** – justification for conditional pass and clear description of required improvements for passing QE.
- **Failed QE** - justification for failing QE and recommendations for the further improvements.

In the case of conditional pass the Examination Committee can request following:
- Revision of the Ph.D. Qualifying Exam Paper to be submitted to the Examination Committee within 2-4 weeks. The committee will review revised version of the paper and decide again whether the candidate has passed or failed QE by voting.
- The committee may require the candidate to answer questions to be submitted in the written form within 2-4 weeks. The committee will then review the candidate’s answers and vote on pass or fail.
- Another oral exam may be required within 2-4 weeks. The committee will vote for pass or fail after the second oral examination.

In the event that the candidate fails the first attempt, a retake must be completed by the end of the fourth semester. In case of a re-take, a new topic must be assigned to the candidate.

If the candidate does not pass on the second try, further doctoral work in MSEN is ended. In such a case, it may be allowable to continue to study for an M.S. degree in MSEN if one has not been conferred by Texas A&M University.

11. Appeal

Candidates have a right to dispute the outcome of their qualifying exam Results Report if the integrity of the exam is not maintained properly. The appeal must be filed no later than two weeks after completion of QE examination. Candidates will provide written justification for dispute (no longer than 2 pages) to the Chair of the MSEN Ph.D. Examination Committee and Graduate Program Advisor, together with the copy of their QE Results Report, QE presentation and QE Paper. The Chair of the MSEN Ph.D. Examination Committee will investigate the claims and discuss the exam with the members of the candidate’s Examination Committee and other members of the MSEN Qualifying Exam Committee. The candidate should be informed about this decision no later than four weeks after the oral QE.