

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Electrical Engineering and Computer Science
Graduate Office, Room 38-444

THE RESEARCH QUALIFYING EXAMINATION

The second component of the qualification process for the doctorate is the Research Qualifying Examination (RQE). The purpose of this examination is to assure that students in the doctoral program have demonstrated the ability to carry out research effectively and to communicate the results in written and oral form. The research that is described should be completed while a graduate student in EECS at MIT. This memorandum describes the procedures and schedule to complete the research qualification exam.

OVERALL DESCRIPTION OF THE RQE

Students apply to take the RQE after they have completed the TQE and when they have completed sufficient research to form the basis for the examination. EECS graduate students apply for the RQE online at <http://www.eecs.mit.edu/EECSgradrequirements>. For most students, the research described in the exam will be the research done for the SM/MEng thesis carried out at MIT. Please submit a short abstract describing the research when submitting the RQE application.

The RQE has three inputs:

- a letter from the research supervisor,
- a written report on the research,
- an oral presentation to a faculty committee (the RQE Committee).

The output of the RQE is:

- a written recommendation from the RQE Committee to the Committee on Graduate Students (CGS) regarding the qualification of the student and specifying any additional requirements that should be satisfied.

The final decision concerning qualification is the responsibility of the CGS.

The research supervisor's letter

The letter from the research supervisor serves two purposes:

- to describe the manner in which the student conducted the research,
- to give a professional appraisal of the quality of the research.

The faculty on the RQE Committee are not necessarily active in the field of the student's research and need to be able to rely on the supervisor's assessment in order to place the student's contribution in context.

Research done at a company is usually not appropriate for the RQE. An exception is the research done by a student in EECS' VI-A program; in this case, the MIT thesis supervisor will be asked to write the letter.

The written report

The student prepares a written report describing the research and submits two copies to the RQE Committee at least two weeks before the oral presentation. The report should be in a format similar to a journal publication in the field and should be no more than 20 pages (about 5000 words) in length.

If the RQE Committee finds that the report is unsatisfactory, the student should be informed at least one week before the scheduled presentation that revision will be necessary. The RQE Committee should make specific suggestions for revision and reschedule the presentation if necessary.

If the student has already prepared a journal article based on the research, the journal article may be used as the report. If the article has multiple authors, the student's contribution must be clearly identified and the research supervisor must certify the extent to which the article is the student's work.

It is appropriate for the student to ask others, including the research supervisor, to read and comment on the report and for the student to revise the report accordingly.

Students are also encouraged to take advantage of the EECS Communication Lab (Comm Lab) to help prepare for the RQE. The Comm Lab is a resource that the department provides to support graduate students with their scientific writing, speaking and visual design to communicate their science more effectively. Comm Lab staff are EECS graduate students and post-doctoral associates; they are both content experts and trained communication coaches. Please make an appointment with the EECS Communication Lab at <http://mitcommlab.mit.edu/eecs>.

Help, particularly for English Language Learners, is obtained from the staff and on-line resources from the Institute-wide MIT Writing and Communication Center <http://cmsw.mit.edu/writing-and-communication-center/>. The goal is for the student to produce a professional quality report utilizing whatever auxiliary resources are available for the purpose, while maintaining prime authorship and responsibility.

The RQE Committee

The RQE Committee consists of two members of the EECS faculty who are not necessarily expert in the field of the student's research, but who are generally knowledgeable in the area. When applying for the RQE, the student is asked to submit names of faculty who would be appropriate members of the committee. The RQE Committee is appointed by the appropriate Area Chair taking account of the student's suggestions and of the need to have an equitable distribution of examinations among the faculty. One of the two faculty is designated as chair of the RQE Committee; the chair will have the responsibility for scheduling the presentation and making a report to the CGS.

The oral presentation

The student should prepare a presentation of about 30 minutes in length. The oral presentation is followed by a question period during which the RQE Committee asks questions that are related to the material presented. The entire examination will normally be about one hour in length. The goal is a professional presentation to an informed audience who has read the written report. Visual aids and demonstrations are at the discretion of the student who should secure any needed equipment.

The RQE Committee should meet without the student present in order to arrive at a recommendation regarding qualification. The RQE committee should then meet with the student to describe their recommendation. This meeting could occur immediately after the oral presentation; if it does not, it should be scheduled to occur as soon as possible and the student should be so informed at the end of the oral presentation.

Recommendation on qualification

The RQE Committee should consider the information supplied by the research supervisor, the quality of the written report, the quality of the presentation, and the degree to which the student demonstrates understanding of the context of the research. The committee is expected to comment briefly on each of these items in the report that conveys their recommendation to the CGS. Specific suggestions or constructive feedback should also be given to the student at the meeting after the oral presentation.

For most students, the oral presentation will be well done and the result of the examination will be that they are qualified for doctoral study. In a few cases, the committee may decide that some specific action is desirable in order to assure that the student is qualified for the doctoral program. The committee may make a recommendation that the student be considered qualified, and that the doctoral committee or Graduate Counselor be charged with ensuring that the proposed action takes place promptly. Examples of the type of recommendation that might be made include teaching a specific subject, carrying out a literature search, taking a specific subject or making a public presentation of the research.

The committee may decide that there are additions or improvements that the student should make before becoming qualified and that these can be done quickly and evaluated at another oral presentation session. In this case, the committee can continue the examination to a later date. The committee should be precise in informing the student what is required and should schedule the continuation within a few weeks at most. The chair is urged to communicate the committee's expectations in writing to the student as well as orally at the conclusion of the original session. The RQE Committee will generally not make a recommendation to the CGS until after the continuation is completed.

If the committee decides that there are serious defects that cannot be remedied in a short time, the committee may recommend that the student not be qualified for doctoral study. In discussing this recommendation with the student and in the report to the CGS, the RQE committee should be very clear in stating the reasons for the decision. The student should be informed that it may be possible to repeat the examination with another committee and that the final decision rests with the CGS.

Decision by Committee on Graduate Students

The Committee on Graduate Students may accept the recommendation of the RQE Committee and will then send a letter to the student stating the result. The CGS has the responsibility to assure that there is equity across the department in the way students are judged and that the expectations of the department are maintained. They may, therefore, modify the recommendation of the RQE Committee when appropriate.

If the RQE Committee recommends that the student not be qualified, the CGS has a special responsibility to consider the case in detail and will generally discuss the outcome with the research supervisor and Graduate Counselor before reaching a decision.