

SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING

Guidelines for the Master's Thesis

Last Revised: July 2017

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Purpose of this Handbook

The purpose of this handbook is to guide students and faculty through the process of preparing, submitting, and approving the Master's thesis. This handbook supplements the MS thesis option information provided in the ECE Graduate Handbook. Students and faculty should refer to the information contained here during the process of completing the thesis option Master's degree requirements.

This manual is not intended to be an exhaustive set of rules. The policies and procedures of the Board of Regents of the University System of Georgia, as well as those issued by the central administration of the Georgia Institute of Technology, supersede the information contained in this document.

If additional information is needed, the ECE Graduate Affairs Office should be contacted. Students are strongly encouraged not to rely upon other students for procedural information.

The Basic Steps

The steps outlined below are provided to guide MS thesis option students, their advisors and thesis committee members through the MS thesis process. The Graduate Studies – VPR office also provides information regarding the preparation and submission of the MS thesis and approval forms on their website (<http://www.grad.gatech.edu/theses-dissertations>).

Advisor Selection

- Selection of a research advisor should be a priority for MS students seeking the thesis option degree.
- An advisor should be selected no later than a student's second term in the MS program.
- The ECE Graduate Affairs Office is notified of the advisor selection by means of the completed MS Advisor Selection form. This form is available at: <https://www.ece.gatech.edu/masters-degrees>.
- In addition to naming the MS thesis advisor, the MS Advisor Selection form defines the research area to be studied by the student.
- MS students should not register for ECE 7000 (MS thesis research) hours unless the advisor selection form has been submitted to the ECE Graduate Affairs Office.
- The advisor's signature on the selection form documents an agreement to serve as research advisor.
- The student or the advisor may terminate this arrangement by working through the ECE Graduate Affairs Office.

Responsible Conduct in Research training

- The RCR Academic Policy for Master's Thesis Students applies to all Master's students who register for thesis hours (courses numbered 7000). Detailed information can be found at <http://www.rcr.gatech.edu/masters-policy>.

Thesis Topic Approval

- The "Request for Approval of the Master's Thesis Topic" is a Georgia Institute of Technology form with which ECE seeks approval of the master's thesis topic on behalf of the student.
- The official approval form is located at: <http://www.grad.gatech.edu/theses-dissertations-forms>.
- The student prepares the "Request for Approval of the Master's Thesis Topic" and signs the form. An abstract describing the research undertaken is included in the "Brief Description" area of the form. The student also needs to prepare a 5-10 page research summary, preferably in the Thesis format.
- The student and the research advisor select two additional ECE faculty members to serve on the MS Thesis committee. Non-ECE faculty can also serve in the MS Thesis committee.
- The "Request for Approval of the Master's Thesis Topic" is submitted to the committee along with the research summary.
- Upon approval of the research plan by the MS Thesis committee, the "Request for

Approval of the Master's Thesis Topic" form is signed and submitted to the ECE Graduate Affairs Office for processing. An electronic copy of the research summary and the RCR completion certificate are also required at the time of the submission.

- **ECE requires that the thesis topic form be submitted to the ECE Graduate Affairs Office for approval a minimum of 90 days prior to submitting the thesis to the MS Thesis Committee for final approval.**

Thesis Submission

- When the advisor determines that the thesis research is complete, the student submits the MS thesis to the MS Thesis committee for their approval.
- Guidelines for preparation and submission of the MS thesis are available at: <http://www.grad.gatech.edu/theses-dissertations>.
- The School of Electrical and Computer Engineering does not require a public defense of the MS thesis, but the student's MS Thesis committee may require a defense.
- The ECE Graduate Affairs Office will post notification of the MS defense when provided with information regarding the defense schedule.
- Notification of the MS defense should be submitted using the Contact Us form <https://www.ece.gatech.edu/content/contact-graduate-affairs-office-current-students>, at least one week before the thesis defense. The notification needs to contain:
 - The name of the student, the advisor, and the committee.
 - Thesis title and abstract
 - Day, date and time of the defense
 - Room and building in which the defense will be held.
- When the MS Thesis committee determines that the thesis is ready to submit to the Georgia Tech Office of Graduate Studies and Research, the committee signs the "Certificate of Thesis Approval" form.
- In addition to the signing Certificate of Thesis Approval, each of the committee members has to fill out an evaluation form. The form can be found in the M.S. Thesis section of the M.S. Degrees page <https://www.ece.gatech.edu/masters-degrees>.
- The ECE Graduate Affairs Office signs the "Certificate of Thesis Approval" form before the student submits the final documents and the thesis to the Graduate Studies – VPR office. The checklist and forms can be found at <http://www.grad.gatech.edu/theses-dissertations-forms>.
- Georgia Institute of Technology deadlines for submission of the thesis for graduation in a particular term may be found at: <http://www.grad.gatech.edu/theses-dissertations-deadlines>.

Switching from Thesis to Non-Thesis Option

- The Institute encourages students who embarked on a thesis option to continue with it and successfully complete the MS Thesis.
- However, if for any reason the research cannot be completed in a timely manner and the student and advisor decide together that the student will benefit more from a non-thesis option, the student will be allowed to switch to non-thesis only after the ECE Graduate Affairs Office received a written notice from the research advisor explaining the

circumstances that led to the change of degree option. The Associate Chair for Graduate Affairs will make a decision based on the letter.

Research Summary and Thesis Topic Approval

Purpose

The purpose of the research summary is to describe clearly and precisely the research that is to be presented as the basis of the thesis.

Submission

The research summary should be submitted as soon as the student and the research advisor agree on the nature and scope of the research.

As a rule, the following steps should be taken before preparing the summary.

Step 1: Make a preliminary investigation, consisting of library research and discussions with various faculty members concerning the choice of a subject.

Step 2: Make an exploration of the problem with a view to discovering where the major difficulties are likely to arise.

If the work is primarily experimental, the major difficulty may lie in the construction of a critical item of equipment, or in devising a method of making an important measurement.

If the work is primarily theoretical, the major difficulty may be mathematical in nature. It is not expected that such problems will be solved before the summary is prepared, but they should be identified. It is then possible to make reasonable estimates of the time, effort, etc., that will be required to complete the work.

Another reason for identifying critical obstacles is that both the student and the advisor are thereby assured of an adequate understanding of the project. Otherwise, much time can be wasted in fruitless efforts. A substantial amount of work must be done to reach this point.

Step 3: Devise a plan of attack that promises to lead to a solution of the problem and the attainment of the objectives of the research.

Only after this has been accomplished is it possible to make a reasonable estimate of the time, equipment, and facilities that will be needed to complete the project. At this stage it may be necessary to revise the objectives of the thesis in order to limit its scope. The research summary should be prepared at a time when the objectives are still somewhat fluid. **The research should not be essentially complete before the summary is presented.** The summary should make clear what has been accomplished at the time it is written as well as what has yet to be undertaken.

Format

The summary should contain the following information:

(a) **The problem**

The summary should begin with a clear, concise statement of the problem and the proposed method of attack. This statement will usually begin, "The objective of the proposed research is...." This one simple English sentence should state exactly that – the objective of the research. This statement is followed by a few sentences of explanation or amplification, and a description of the method of attack. This information should be in a form suitable for use in the "Request for Approval of Masters Thesis Topic" form, which is submitted to the Office of Graduate Studies and Research after the summary has been approved by the School.

(b) **Origin and history of the problem**

This section will contain a brief review of the literature and previous work pertinent to the proposed research. This should not be an exhaustive survey, but it should be complete enough to show that the student is aware of important relevant work and the "state of the art" as it applies to the problem.

(c) **The proposed research**

This section will contain a fairly detailed discussion of the proposed research, elaborating on the statement in (a). It may contain pertinent theory, for example. It should also point out the difficulties referred to in STEP 2, and the proposed solution.

(d) **Work completed**

This section should describe what has been accomplished. If partially complete results have been obtained, they should be presented, but derivations and other details should be omitted.

(e) **Work remaining**

This is an estimate and an outline of the work needed to complete the project, and the time required for completion.

(f) **Facilities needed**

This section should list the major items of equipment and facilities needed, including those already in use. Be brief, but specific. It is not sufficient to say "The facilities, etc., are available". If supplies, equipment or facilities are needed and not already available in the School, the means for obtaining them should be indicated. Unusual or special items require advanced planning and these are the most important. Computing time requirements should also be given if applicable.

Other Considerations

The summary should only be long enough to present the necessary information. The length will depend on the nature of the problem, but approximately 10 double-space typewritten pages are usually sufficient.

If the thesis research is part of a larger project, its relationship to the larger project should be pointed out. This can be done under "origin and history". **The particular aspect of the problem that represents an original contribution by the student should be made clear.** This will usually be done under the heading "The Proposed Research".

The summary should be written in acceptable English. A student who has unusual difficulty in presenting ideas in writing may use the summary as an exercise in preparation for the thesis write-up.

MS Thesis Checklist

- Select research advisor and determine thesis research area.
- Submit MS Thesis Advisor Selection form to the ECE Graduate Affairs Office.
- With research advisor, determine timetable for research and thesis completion activities.
- Student and advisor select two ECE faculty members to serve on Thesis committee. For non-ECE committee members, contact the Academic Office.
- Prepare research summary and “Request for Approval of the Master’s Thesis Topic” for submission to the Thesis committee.
- Thesis committee indicates approval of research summary by signing “Request for Approval of the Master’s Thesis Topic.”
- Signed thesis topic form is submitted to ECE Graduate Affairs Office for approval and processing, together with a soft copy of the research summary and the RCR certificate.
- Thesis is submitted to Thesis committee for approval.
- If required by the committee, a public defense of the thesis is scheduled at least five working days (Monday-Friday) in advance.
- Thesis committee signs “Certificate of Thesis Approval” and fills out the evaluation form.
- Student obtains signature on Certificate of Thesis Approval” from ECE Graduate Affairs Office.
- Students electronically submits thesis and delivers required paperwork to the Georgia Institute of Technology Graduate Studies – VPR office.

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MS Thesis Guidelines