Department of Electrical and Computer Engineering
Preliminary Assessment Plan of the Graduate Program

June 27, 2015

**TASK 1: Submit name of the program’s assessment contact person**

The contact person for the assessment of the ECE graduate program is the ECE Graduate Studies Chair, **Prof. Andrea Serrani**

**TASK 2: Confirm or modify the program’s learning goals:**

The learning goals have been revised by the Graduate Studies Committee and approved by the Faculty at the ECE Faculty Retreat (April 28, 2015). The updated learning goals read as follows:

**Learning Goals: Masters Program**

1. MS graduates in Electrical and Computer engineering will have a broad knowledge of ECE subject areas and advanced knowledge in one or two areas.

2. **MS-project track** (non-thesis option) graduates in Electrical and Computer engineering will be able to analyze engineering problems and apply their knowledge to solve them. **MS-research track** (thesis option) graduates in Electrical and Computer engineering will be able to analyze research-oriented engineering problems and apply their knowledge to solve them.

3. MS graduates in Electrical and Computer engineering will have effective professional skills including oral and written communication, leadership, independence and teamwork all performed in an ethical manner.

**Learning Goals: Ph.D. Program**

1. Ph.D. graduates in Electrical and Computer engineering will have an extensive knowledge in and a thorough understanding of one of the specialized areas of ECE and competency in a second area.

2. **Ph.D. graduates in Electrical and Computer engineering will be able to identify, formulate, analyze and solve research problems, thereby advancing knowledge through creative scholarship.**

3. Ph.D. graduates in Electrical and Computer engineering will have effective professional skills including oral and written communication, leadership, independence and teamwork aptitude, all performed in an ethical manner.

**TASK 3: Identify one learning goal central to the program’s success**

The Graduate Studies Committee has identified Learning Goal #2 of the Ph.D. program (highlighted in boldface in the above list) to be key to the program’s success. This choice has been approved by the Faculty at the ECE Faculty Retreat.
**TASK 4: Use that learning goal as the basis of your program's preliminary assessment plan**

The Graduate Studies Committee has deliberated that, at this preliminary stage of the process, preference shall be given to direct measures of evaluation for the chosen learning goal. In particular, the GS Committee has identified that the use of rubrics for the two main Ph.D. graduate examination (candidacy exam and dissertation exam) be the most appropriate tool - at this stage - to assess the fulfillment of learning goal #2. In crafting a preliminary assessment plan, however, the GS Committee has decided to include also an assessment of the other two goals, as this was deemed beneficial to students and the program alike. It is worth noting that the proposed preliminary plan, which will be detailed in what follows, embeds a natural feedback mechanism that is believed to have a beneficial effect for the student as they progress towards the completion of their dissertation work. Consideration of indirect measures (in particular, analysis of students' publication record and bibliometric data) shall be postponed until more details are made available concerning the software TracDat mentioned in the communication from the Graduate School.

**Plan details:** Rubrics are used by members of graduate exam committees (candidacy exam and final exam) to evaluate key outcomes related to the selected learning goals for the Ph.D. program. The same rubric, *mutatis mutandi*, is used for the two exam.

- The rubrics will be available on the ECE web site. Students will be reminded of the rubrics as they enter the Ph.D. program (that is, after the student passes the ECE qualifying exam).
- The student’s performance will be evaluated by the members of the exam committee on the basis of assessment of ten outcomes detailed in the rubric, on a four-grade scale, from "does not meet" to "exceed expectations".
- The ten outcomes in the rubric cover all learning goals of the ECE Ph.D. program (items 1, 2 and 3 of the list found above), but emphasis will be placed on learning goal #2.
- The cumulative score will be given to the student after the candidacy exam, together with the written comments from the members of the committee (both the score and the comments are anonymous.) This will serve mainly as a feedback to the student, who will be able to clearly identify areas of improvement.
- The same rubric (modulo small modifications to account for differences in the content of the two exams) will be used during the Ph.D. final examination.
- The rubric for the Ph.D. final exam if the one that will be used for evaluation of the program. In particular, a comparative analysis with the score from the
qualifying exam will inform the Graduate Studies Committee about specific areas where improvements are needed, and guide the steps to be taken.

- The Graduate Studies Committee will review the data on a yearly basis and make appropriate recommendations, possibly involving other departmental committees (Curriculum Committee, above all) when appropriate.

During the initial phase of the implementation of the plan (Autumn Semester 2015,) the rubrics will be made available to the members of the exam committees in printed form. A transition to a web-based form with restricted access to the exam committee members is currently being planned to facilitate data gathering and analysis. Again, the GS Committee is waiting to know more details on the software *TracDat* before making a final decision. Furthermore, during this initial phase, data from both the candidacy and the final examination will be collected and used for program evaluation.

**Attachments:**

1. Rubric for evaluation of learning outcomes at the Ph.D. Candidacy Exam
2. Rubric for evaluation of learning outcomes at the Ph.D. Final Exam
# Rubric for Graduate Learning Outcome Assessment
## ECE Ph.D. Program - Ph.D. Final Examination

**Student Name:** ____________________________________________  **Date:** ________________

**Evaluator:** ______________________________________________

**Explanation of Rankings**
- **Exceeds Expectations:** Exceptional understanding of research findings and/or an outstanding ability to report and interpret results.
- **Meets Expectations:** Concepts are clearly stated, understood and delivered by the student.
- **Meets Some Expectations:** Partial understanding of concepts and methods and/or difficulty in delivering findings.
- **Does Not Meet Expectations:** Very limited to no understanding of specific concepts or methods and/or inability to deliver findings.

For each attribute please select a ranking (checkmark a box).

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Exceeds Expectations</th>
<th>Meets Expectations</th>
<th>Partially Meets Expectations</th>
<th>Does Not Meet Expectations</th>
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</thead>
<tbody>
<tr>
<td>Knowledge of concepts and methodologies in primary and secondary areas <em>(LG #1)</em></td>
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<tr>
<td>Ability to identify, formulate and solve meaningful research problems <em>(LG #2)</em></td>
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<td>Awareness of the relevant literature and appropriateness of citations <em>(LG #2)</em></td>
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<tr>
<td>Originality, significance and potential impact of dissertation <em>(LG #2)</em></td>
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<td>Delivered research findings to scientific community via appropriate instruments <em>(LG #2)</em></td>
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<td>Clarity and effectiveness in delivering research findings in written form <em>(LGs #3)</em></td>
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**Totals: tally each expectation column**

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**Overall rating:** Check one of the following as your overall rating.

- [ ] Exceeds expectations
- [ ] Meets expectations
- [ ] Partially meets expectations
- [ ] Does not meet expectations

Please provide comments on strengths and weaknesses of the student.

**Final Comments:**

______________________________

Signature of evaluator:
# Rubric for Graduate Learning Outcome Assessment

## ECE Ph.D. Program - Candidacy Examination

**Student Name:** ____________________________  **Date:** ________________

**Evaluator:** ____________________________

**Explanation of Rankings**

- **Exceeds Expectations:** Exceptional understanding of research findings and/or an outstanding ability to report and interpret results.
- **Meets Expectations:** Concepts are clearly stated, understood and delivered by the student.
- **Meets Some Expectations:** Partial understanding of concepts and methods and/or difficulty in delivering findings.
- **Does Not Meet Expectations:** Very limited to no understanding of specific concepts or methods and/or inability to deliver findings.

For each attribute please select a ranking (checkmark a box).

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**Overall rating:** Check one of the following as your overall rating.

- ☐ Exceeds expectations
- ☐ Meets expectations
- ☐ Partially meets expectations
- ☐ Does not meet expectations

Please provide comments on strengths and weaknesses of the student.

**Final Comments:**

**Signature of evaluator:** ____________________________