Annual Academic Assessment Report Cover Sheet

Assessment reports are due the 1st Wednesday after the Fall Term
Email to: assessment@unlv.edu

Program Information:

<table>
<thead>
<tr>
<th>Program Assessed</th>
<th>MS and PhD programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Electrical and Computer Engineering</td>
</tr>
<tr>
<td>College</td>
<td>Engineering</td>
</tr>
<tr>
<td>Department Chair</td>
<td>Biswajith Das</td>
</tr>
<tr>
<td>Assessment Coordinator</td>
<td>Henry Selvaraj</td>
</tr>
<tr>
<td>Date Submitted</td>
<td>02.12.2019</td>
</tr>
</tbody>
</table>

Contact Person for This Report

<table>
<thead>
<tr>
<th>Name</th>
<th>Henry Selvaraj</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone</td>
<td>702 8954184</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:Henry.Selvaraj@unlv.edu">Henry.Selvaraj@unlv.edu</a></td>
</tr>
</tbody>
</table>

Please attach a narrative (not to exceed 4 pages, excluding appendices) addressing the following:

- What are the student learning outcomes? Please provide a numbered list.
- Which learning outcomes were assessed?
- How were they assessed? (Programs must use at least one direct assessment of student learning.)
- Undergraduate programs should assess at least one University Undergraduate Learning Outcome (UULO) each year, which may or may not overlap with a program learning outcome.
- Graduate programs should assess at least one outcome related to one of the following graduate level requirements each year:
  - student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.
  - activities requiring originality, critical analysis and expertise.
  - the development of extensive knowledge in the field under study.
- What was learned from the assessment results?
- How did the program respond to what was learned?

Please limit the narrative portion of your report to no more than four pages. You may attach appendices with data, tables, charts, or other materials as needed. Please explain the relevant conclusions from any appendices in your narrative. Please contact the Office of Academic Assessment if you have questions or need assistance.
Annual Graduate Assessment Report for Calendar Year 2018
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice
ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Consistent with the Three-Year Plan, the Annual Assessment Report for Calendar Year 2018 will mainly focus on Communication and Leadership that complements the UNLV required outcome, “Student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.” The narrative below addresses the following Office of Academic Assessment questions regarding the ECE Graduate Program in the calendar year 2018

- What are the student learning outcomes? Provide a numbered list.
- Which learning outcomes were assessed?
- How were they assessed? Student learning must be backed up with at least one direct assessment.
- What was learned from the assessment results?
- How did the program respond to what has been learned?

- What are the student learning outcomes?

The broad student learning outcomes of the ECE Graduate Program are

1. Demonstrate strong technical knowledge in their field of study with the potential to lead and direct engineering and scientific teams.
2. Demonstrate the ability to learn independently and generate new knowledge in their chosen field of study.
3. Reach the highest academic level with the potential to become a leader and an authority in Electrical and Computer Engineering.

Whereas the outcomes of the Office of Academic Assessment program for the ECE Graduate Program are

- Student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice
- Activities requiring originality, critical analyses, and expertise
- The development of extensive knowledge in the field under study

- Which learning outcomes were assessed?

The major learning outcome being assessed in this report is Communication and Leadership which is related to activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice.

- How were they assessed?

Thesis/Dissertation advisers completed a form (Appendix B; also contains a table of faculty that did and did not participate in this assessment process) regarding of the advancement of their student (students) towards the completion of their culminating experience. Faculty identified at
least one critical thinking problem associated with the experience and were asked how the student has advanced on that problem over the past year. Student activities associated with the culminating experience in terms of communication (written and verbal) and leadership were evaluated. Leadership extending outside of the culminating experience was address as well. Noninclusive, leadership roles extended to teaching, mentoring, and research collaborations both on and off campus. Minor emphasis in the report accounted for the student’s activities on the development of extensive knowledge in the field under study and the critical thinking.

Communication and leadership in course work is addressed more on a class basis instead of a single student basis. Faculty have completed a form (Appendix C; also contains a table of faculty that did and did not participate in this assessment process) which identifies one critical problem in their course that was assigned to students. Based on at least one direct learning assessment, faculty where asked to reflect on how the students as a whole or in subgroups addressed the problem with an emphasis on verbal and/or writing skills. Faculty have the opportunity to comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and orally) difficult conceptual topics especially those requiring critical thinking? Typically the problem assessed is assigned by way of an exam problem, project, or homework assignment.

It is anticipated that faculty reflection regarding student performance may be used as a tool to enhance student-professor interaction leading to an enhanced course experience in future classes or to an enhanced student research experience.

• **Brief Summary of Assessment Findings**

**Overall Faculty and Student Information**

*Pertaining to Culminating Experience (Thesis/Dissertation)*

- 15 of 18 faculty/staff participated in the assessment
- 21 thesis/dissertation graduate students were assessed in 2018

*Pertaining to Graduate Courses*

- 15 out of 18 faculty/staff responded in the assessment
- Two of the 18 faculty did not teach a graduate course in 2018.
- 14 graduate courses were assessed: five 700 level courses and nine 600 level courses
- Not all faculty taught graduate level courses

**Student Outcomes Thesis/Dissertation**

- Six students attained an MS degree; Three students attained a PhD degree
- Four PhD candidates progressed to advanced standing.
- All students that have advanced in degree or attained a degree have performed above average in both the oral and written part of their thesis/dissertation as evaluated by faculty on their advisory board.
- Communication and leadership activities where reported under a number of different avenues: presentations at conferences; UNLV poster sessions and Rebel Grand Slam; writing papers, prospectus, thesis, and dissertation; mentoring undergraduate students, interns, and/or graduate students; working as a team member or leader in a research collaborations both on and off campus; just day to day discussions with students; and active leader in group discussions.

**Graduate Course Outcomes (Based on the courses assessed)**

- Complex critical thinking problems are being assigned in the form of projects, exam problems, or homework problems.
Faculty have been asked to comment on how effective their class is in communicating their thoughts (written and/or verbal) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. Some faculty did not respond on the “effectiveness” of the communication skills. The assessment form has been revised (Appendix A) to include the statement “Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?”

Faculty that did address the students effectiveness to communicate their ideas stated that:

- Student presentation of material are not mature, they lack the experience of identifying and prioritizing the importance of findings
- Students do have some writing issues but the writing center seems to help
- Students do not have a good handle in expressing their conceptual ideas in words; they have difficulty in providing a clear explanations or clear descriptions

Writing technical reports and formulating and structuring papers are important. The graduate student needs practice and guidance in technical writing: both survey and report type which includes structuring one’s thoughts in a concise and a cohesive manner.

Graduate students, especially international students, need refined presentation skills.

In spring 2018, two student passed the PhD Comprehensive Exam; two students passed the MS Comprehensive Exam; three students passed the Qualifying Exam; and three students failed the Qualifying Exam.

In fall 2018, four students passed the PhD Comprehensive Exam; three students passed the Qualifying Exam; one student failed the Qualifying Exam (on first sitting).

Four PhD students in 2018 advanced in candidacy.

What was learned from the assessment results?

- Some faculty that did address the students effectiveness to communicate their ideas stated that:
  - Student presentation of material are not mature, they lack the experience of identifying and prioritizing the importance of findings
  - Students do have some writing issues but the writing center seems to help
  - Students do not have a good handle in expressing their conceptual ideas in words; they have difficulty in providing a clear explanations or clear descriptions

Other faculty indicated that students had adequate communication skills. These comments were directed mainly to graduate courses taught

- Writing technical reports and formulating and structuring papers are important. It was suggested that graduate students need a technical paper writing component: both survey and report type.

Graduate students, especially international students, need refined presentation skills.

MS and PhD students are matriculating through the program. Students graduating in the year 2018 are graduating with a thesis/dissertation culminating experience. Overall, these students as judged by their thesis/dissertation advisory board have faired well [above average] in both their written and oral culminating experience. This could be a consequence of faculty working closely with their students in writing their thesis and papers especially since most of our students are not from the US. It could also be a consequence that our students have matured professionally in order to write a well defined thesis.

How did the program respond to what has been learned?

- The department was presented with a hardcopy of the top tier graduate Recruitment, Retention, Progression, and Completion (R2PC) plan initiated and required by the Graduate College and developed by the ECE Graduate Committee regarding strategies to enhance our graduate
program. The one hour meeting was divided into about four 15 minute intervals. The first 15 min was directed toward recruitment, the second towards retention, progression, and completion, and the third towards resources. The last 15 min was reserved for discussions. Based on the second interval, student’s communication abilities were brought up. It appears that the current workshops offered by the College of Engineering are not effective to our student body.

- Areas of improvement were alluded to in the meeting. A one or two semester formal technical writing and presentation course for all graduate students has been suggested. Students need to learn how to formulate and structure their thoughts effectively and concisely in both the written and oral word. In some cases where the student has a good command on the English language, students need to refine and/or optimize their communication methods to be a more effective technical public speaker and/or technical writer.
Appendix A

Form for Major Assessment: Communication and Leadership.
(to all graduate faculty and those who taught graduate classes)
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership

ECE Department Minor Assessment: Critical Thinking

ECE Department Minor Assessment: Intellectual Depth

**Part 1a**

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). *If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.*

*Research Component* – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) <strong>If no grad. students, type DNA for student name.</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td></td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td></td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td></td>
</tr>
<tr>
<td>Hypothesis:</td>
<td></td>
</tr>
<tr>
<td>Motivation:</td>
<td></td>
</tr>
<tr>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td></td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td></td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td></td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. <strong>Comment on the quality of the student's communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
<td></td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td></td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


**NOTE: Presentations in courses outside of seminar are not appropriate here.**

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
| Student Name/Adviser Name:  
<table>
<thead>
<tr>
<th>(BOTH names required) If no grad. students, type DNA for student name.</th>
</tr>
</thead>
</table>
| Critical Thinking-Culminating Exp.  
| 1/1/2018 – 12/31/2018 |
| Bullet Advances in Thesis/Dissertation (with regards to critical thinking) |
| Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) |
| Other: |
| Intellectual Depth (since beginning of program) |
| No.# courses in ECE Major Area (MS* or PhD***) |
| No.# courses in ECE Minor Area (MS** or PhD***) |
| No.# course in Second Minor (PhD only) |
| Pass Qualifier Exam? |
| Pass Comprehensive Exam? |
| Pass Preliminary Exam? |

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
## Part 2

This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

| Course Component – Communication and Leadership/Critical Thinking – 1/1/2018 – 12/31/2018 |
|---|---|
| **Course Number/Instructor Name:**<br> *If did not teach a graduate course, type DNA for course number.* |  |
| **Course Title:** |  |
| **Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.** |  |
| **Identify what makes the problem a critical thinking problem** |  |
| **Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.** |  |
| **Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc.**<br> **Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?** |  |
### Appendix B

**Faculty Evaluations for 2018**  
Communication and Leadership – Part 1  
Student Research Assessment

Faculty Participants (15/18):

<table>
<thead>
<tr>
<th>Baker</th>
<th>Baghzouz</th>
<th>Chmaj</th>
<th>Jiang</th>
<th>Kachroo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latifi</td>
<td>Morris</td>
<td>Regentova</td>
<td>Saberinia</td>
<td>Selvaraj</td>
</tr>
<tr>
<td>Singh</td>
<td>Schill</td>
<td>Stubberud</td>
<td>Yang</td>
<td>Ming Zhu</td>
</tr>
</tbody>
</table>

No Response (3/18)

<table>
<thead>
<tr>
<th>Das</th>
<th>Muthukumar</th>
<th>Sun</th>
</tr>
</thead>
</table>
# Appendix C

## Faculty Evaluations for 2018

### Communication and Leadership – Part 2  Graduate Course Assessment

Faculty Participants (15/18):

<table>
<thead>
<tr>
<th>Baker</th>
<th>Baghzouz</th>
<th>Jiang</th>
<th>Harris</th>
<th>Kachroo</th>
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</thead>
<tbody>
<tr>
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<td>Morris</td>
<td>Regentova</td>
<td>Saberinia</td>
<td>Singh</td>
</tr>
<tr>
<td>Schill</td>
<td>Stubberud</td>
<td>Yang</td>
<td>Chmaj</td>
<td>Ming Zhu</td>
</tr>
</tbody>
</table>

No Response (3/18)

<table>
<thead>
<tr>
<th>Das</th>
<th>Muthukumar</th>
<th>Sun</th>
</tr>
</thead>
</table>
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a
To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component* – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Narayan Bhusal/Yahia Baghzouz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>2016</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>MS Thesis</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>THE COMBINED EFFECT OF PHOTOVOLTAIC AND ELECTRIC VEHICLE PENETRATION ON CONSERVATION VOLTAGE REDUCTION IN DISTRIBUTION SYSTEM.</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>Photovoltaic systems and electric vehicle charging have little impact on conservation voltage regulation.</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Answer the question on how various levels of distributed PV systems and EV charging station affect CVR in electric distribution system.</td>
</tr>
<tr>
<td>Objectives:</td>
<td>Verify on whether the above hypothesis is valid and under what conditions and penetration levels the impact start to become noticeable.</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>Thesis defense/ April 11, 2018</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>NA</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>The student was a graduate assistant for the power systems laboratory in Spring 2017, and 2018.</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td>The student had a serious problem with English grammar. Spoken English is somewhat satisfactory, although he carries a heavy accent – typical of international students from Nepal and nearby countries. The student did not show interest in discussing nor attempting to investigate difficult topics, especially those requiring critical thinking.</td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td>MS, Spring 2018</td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td>Student joined the PhD program at UNR.</td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.
*** Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to
community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Student Name/Adviser Name:**
(BOTH names required) If no grad. students, type DNA for student name.

| Narayan Bhusal/Yahia Baghzouz |

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**Critical Thinking-Culminating Exp.**
1/1/2018 – 12/31/2018

- **Bullet Advances in Thesis/Dissertation (with regards to critical thinking):**
  The student did not show any interest in putting an effort to applying, analyzing, synthesizing, and evaluating information to reach an answer to the problem at hand, even after putting pressure at a number of occasions.

- **Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking):**
  The advisor had to guide the student step-by step due to his reluctance to conduct his own research.

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**Other:**

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**Intellectual Depth (since beginning of program):**

| No.# courses in ECE Major Area (MS* or PhD***) | 4 |
| No.# courses in ECE Minor Area (MS** or PhD***) | 4 |
| No.# course in Second Minor (PhD only) | n/a |
| Pass Qualifier Exam? | n/a |
| Pass Comprehensive Exam? | n/a |
| Pass Preliminary Exam? | n/a |

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* Number of courses in a major concentration field in ECE
** Number of all remaining courses in ECE
*** Number of courses includes both MS and PhD programs together
**UNLV Outcome Assessed**: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice  

**ECE Department Major Assessment**: Communication and Leadership  
**ECE Department Minor Assessment**: Critical Thinking  
**ECE Department Minor Assessment**: Intellectual Depth

**Part 1a**

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). *If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.*

Research Component* – Communication and Leadership – 1/1/2018 – 12/31/2018

| Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name. | James Mellott  
Dr. R. J. Baker |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>2017</td>
</tr>
</tbody>
</table>
| Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination) | MS thesis  
Theory, Experimental, Computational |
| Tentative Title of Thesis/Dissertation: | VARIABLE TRANSITION TIME INVERTERS IN A DIGITAL DELAY LINE WITH ANALOG STORAGE FOR PROCESSING FAST SIGNALS AND PULSES |
| Hypothesis: | Using analog BI-CMOS design we can implement a circuit to sample signals at an extremely fast rate. The sampled signals can be analyzed at a rate compatible with modern processors. |
| Motivation: | To implement a small efficient way to capture fast analog signals for processing. |
| Objectives: | Design, simulate, implement system to capture fast analog signals using Cadence and the C5 Process. |
| Oral Communication (Type)**/Date | Thesis Defense  
11/15/2018 |
| Written Presentation (Type)**/Date | DNA |
| Professional Leadership (State type with brief details)*** | DNA |
| Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking? |  |
| Degree Awarded; (Type, date) | Master of Science in Electrical Engineering  
12/15/2018 |
| Student efforts beyond the degree |  |

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.  
Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
### Part 1b

**Minor – Critical Thinking, Intellectual Depth**

*After Completion, continue to Part 2*

| Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name. | James Mellott  
Dr. R. J. Baker |
|---|---|
| **Critical Thinking-Culminating Exp.**  
1/1/2018 – 12/31/2018 | DNA |
| Bullet Advances in Thesis/Dissertation (with regards to critical thinking) | |
| Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) | |
| Other: | |
| **Intellectual Depth (since beginning of program)** | |
| No.# courses in ECE Major Area (MS* or PhD***): | 10 |
| No.# courses in ECE Minor Area (MS** or PhD***): | DNA |
| No.# course in Second Minor (PhD only): | DNA |
| Pass Qualifier Exam? | DNA |
| Pass Comprehensive Exam? | DNA |
| Pass Preliminary Exam? | DNA |

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a
To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component* – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Eric C. Monahan / Dr. R. Jacob Baker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>2017</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) / Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>MS thesis</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>High Speed Fast Transient Digitizer Design and Simulation</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>A high speed fast transient digitizer (HSFTD) can function as a low cost, low power replacement for high speed analog-to-digital converters</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Reduce costs, power consumption, and layout area associated with high speed analog-to-digital converters</td>
</tr>
<tr>
<td>Objectives:</td>
<td>Demonstrate ability of HSFTD to sample, in time, high speed analog/transient signals and later reconstruct the sample at a rate set by off-chip control logic</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>Thesis/ Nov. 16, 2018</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>Thesis / Nov. 16, 2018</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)**</td>
<td></td>
</tr>
</tbody>
</table>

Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?

<table>
<thead>
<tr>
<th>Degree Awarded; (Type, date)</th>
<th>Master of Science in Electrical Engineering, Dec. 17, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student efforts beyond the degree</td>
<td>DNA</td>
</tr>
</tbody>
</table>
community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Part 1b**  
*Minor – Critical Thinking, Intellectual Depth*

*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong> (BOTH names required)</th>
<th>Eric C. Monahan / Dr. R. Jacob Baker</th>
</tr>
</thead>
</table>
| **Critical Thinking-Culminating Exp.**  
1/1/2018 – 12/31/2018 | Bullet Advances in Thesis/Dissertation (with regards to critical thinking) |
| | Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) |
| | Other: |
| **Intellectual Depth (since beginning of program)** | |
| No.# courses in ECE Major Area (MS* or PhD***) | 2 |
| No.# courses in ECE Minor Area (MS** or PhD***) | 3 |
| No.# course in Second Minor (PhD only) | 3 |
| Pass Qualifier Exam? | |
| Pass Comprehensive Exam? | |
| Pass Preliminary Exam? | |

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
**Course Component** – **Communication and Leadership/Critical Thinking** – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Course Number/Instructor Name: If did not teach a graduate course, type DNA for course number.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Title:</td>
<td></td>
</tr>
<tr>
<td>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</td>
<td></td>
</tr>
<tr>
<td>Identify what makes the problem a critical thinking problem</td>
<td></td>
</tr>
<tr>
<td>Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.</td>
<td></td>
</tr>
<tr>
<td>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. <strong>Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Part 1a

To ease the burden of assessment, complete the form below for each student that you have taken the roll of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

**Research Component** – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required)</th>
<th>Shada Sharif / Dr. R. Jacob Baker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>2016</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD)/Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>ECE MS thesis / Combination</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Design and Analysis of First and Second Order K-Delta-1-Sigma Modulators in Multiple Fabrication Processes</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>Higher order KD1S modulator will achieve higher sampling rate and higher accuracy.</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Desire to expand on an independent study of delta-sigma modulators used in ADCs.</td>
</tr>
<tr>
<td>Objectives:</td>
<td>The objective is to design a high speed and high accuracy improved delta-sigma modulator.</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>Thesis Defense / November 16th, 2018</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>Thesis Defense / November 16th, 2018</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>Teacher assistance for ECG 720, ECG 721, ECG 722</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td>Student is able to express in words difficult conceptual topics.</td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td>Master of Science in Engineering - Electrical Engineering, Fall 2018</td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.
Note: Presentations in courses outside of seminar are not appropriate here.
***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Student Name/Adviser Name:**
(BOTH names required) **If no grad. students, type DNA for student name.**

Shada Sharif / Dr. R. Jacob Baker

---

**Critical Thinking-Culminating Exp.**
1/1/2018 – 12/31/2018

- Thesis design was completed and simulated using LTspice and MATLAB
- Layout of the thesis was completed and sent for fabrication

- SNR and ENOB reached a good point but could not be improved further
- Thesis chip fabrication was delayed and could not be tested.

**Other:**

**Intellectual Depth (since beginning of program)**

<table>
<thead>
<tr>
<th>No.# courses in ECE Major Area (MS* or PhD***)</th>
<th>15 Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.# courses in ECE Minor Area (MS** or PhD***)</td>
<td>9 Credits</td>
</tr>
<tr>
<td>No.# course in Second Minor (PhD only)</td>
<td>9 Credits</td>
</tr>
<tr>
<td>Pass Qualifier Exam?</td>
<td>DNA</td>
</tr>
<tr>
<td>Pass Comprehensive Exam?</td>
<td>DNA</td>
</tr>
<tr>
<td>Pass Preliminary Exam?</td>
<td>DNA</td>
</tr>
</tbody>
</table>

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
### UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

**ECE Department Major Assessment: Communication and Leadership**

ECE Department Minor Assessment: Critical Thinking

ECE Department Minor Assessment: Intellectual Depth

**Part 1a**

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). *If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.*

#### Research Component – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required)</th>
<th>Vikas Vinayaka/Dr. R. Jacob Baker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>2017</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>EE MS thesis / Combination</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Analysis and design of analog front-end circuitry for avalanche photodiodes (APD) and Silicon photo-multipliers (SiPM) in time-of-flight applications</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>Integration of a photosensor and its associated analog front-end circuitry on the same monolithic chip would result in an integrated optical system design.</td>
</tr>
<tr>
<td>Motivation:</td>
<td>High-speed photosensors such as the APD and SiPM can be fabricated on conventional BiCMOS processes. This makes it feasible to design the entire system on a monolithic chip.</td>
</tr>
<tr>
<td>Objectives:</td>
<td>Design and layout of each component of the integrated optical system such as the APD, SiPM, transimpedance amplifier, comparator and digital-to-analog converter. Design and layout of the entire chip and submit for fabrication.</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>Thesis defense/Nov 15, 2018</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>Thesis submission to committee/Nov 1, 2018</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>Teaching classes ECG620, ECG720, ECG621, ECG721 and ECG722</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td>Student can analyze the problem thoroughly and communicate it effectively.</td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td>Master of Science in Electrical Engineering, Fall 2018</td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.

NOTE: Presentations in courses outside of seminar are **not** appropriate here.

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Part 1b**

*Minor – Critical Thinking, Intellectual Depth*

*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong></th>
<th>Vikas Vinayaka/Dr. R. Jacob Baker</th>
</tr>
</thead>
</table>

| **Critical Thinking-Culminating Exp.**<br>1/1/2018 – 12/31/2018 | MS thesis |

- Bullet Advances in Thesis/Dissertation (with regards to critical thinking)
  - Complete chip was designed containing all required analog front-end circuitry.
  - Circuit blocks were designed considering the design tradeoffs and practical aspects.

- Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)
  - There is room for improvement in the performance of circuit blocks such as the transimpedance amplifier

<table>
<thead>
<tr>
<th><strong>Intellectual Depth (since beginning of program)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No.# courses in ECE Major Area (MS* or PhD***)</td>
<td>5</td>
</tr>
<tr>
<td>No.# courses in ECE Minor Area (MS** or PhD***</td>
<td>4</td>
</tr>
<tr>
<td>No.# course in Second Minor (PhD only)</td>
<td>DNA</td>
</tr>
<tr>
<td>Pass Qualifier Exam?</td>
<td>DNA</td>
</tr>
<tr>
<td>Pass Comprehensive Exam?</td>
<td>DNA</td>
</tr>
<tr>
<td>Pass Preliminary Exam?</td>
<td>DNA</td>
</tr>
</tbody>
</table>

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership

ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Xiangrong Ma/Yingtao Jiang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Spring 2010</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>PhD/Combination</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>vNS: A Novel NUMA-aware Virtual Network Architecture</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>We can improve virtualization network performance that by delegating network functions, reduce far memory reference and shorten the unnecessarily long path</td>
</tr>
<tr>
<td>Motivation:</td>
<td>current network performance among the virtual machine (VM) instances peaked at 20% of the native in our research cloud</td>
</tr>
<tr>
<td>Objectives:</td>
<td>Explore negative factors; obtain model; propose new architecture</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>Prospectus/Mar 2017; Conference paper/Jan 2017, Journal Paper/Jun 2017</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>N/A</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>N/A</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td></td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td></td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


NOTE: Presentations in courses outside of seminar are not appropriate here.

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
### Part 1b

**Minor – Critical Thinking, Intellectual Depth**

*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong></th>
<th>Xiangrong Ma/Yingtao Jiang</th>
</tr>
</thead>
<tbody>
<tr>
<td>(BOTH names required) If no grad. students, type DNA for student name.</td>
<td></td>
</tr>
</tbody>
</table>

#### Critical Thinking–Culminating Exp.

1/1/2018 – 12/31/2018

| Bullet Advances in Thesis/Dissertation (with regards to critical thinking) | - Measured negative factors of network performance  
- Established queen model of virtual network  
- Proposed new architecture |
| Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) | - Implementation of kernel virtual machine functions allowing requires much more time than expected. Existing method have poor performance or not maintained anymore in Linux kernel |

**Other:**

#### Intellectual Depth (since beginning of program)

- No.# courses in ECE Major Area (MS* or PhD***)
  - 5
- No.# courses in ECE Minor Area (MS** or PhD***)
  - 3
- No.# course in Second Minor (PhD only)
  - 3
- Pass Qualifier Exam?
  - Yes
- Pass Comprehensive Exam?
  - Yes
- Pass Preliminary Exam?
  - Yes

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). **If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.**

<table>
<thead>
<tr>
<th>Research Component* – Communication and Leadership – 1/1/2018 – 12/31/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student Name/Adviser Name:</strong> (BOTH names required) <strong>If no grad. students, type DNA for student name.</strong></td>
</tr>
<tr>
<td>Jian Ni/Yingtao Jiang</td>
</tr>
<tr>
<td><strong>Year Admitted:</strong></td>
</tr>
<tr>
<td>Spring 2017</td>
</tr>
<tr>
<td><strong>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination):</strong></td>
</tr>
<tr>
<td>PhD</td>
</tr>
<tr>
<td><strong>Tentative Title of Thesis/Dissertation:</strong></td>
</tr>
<tr>
<td>A smart CVD self–diagnosis tool with VR and Wearable Wireless Device</td>
</tr>
<tr>
<td><strong>Hypothesis:</strong></td>
</tr>
</tbody>
</table>
| For normal Stress (Exercise) test, subjects receive stress with its intensity progressively increasing to 85% of maximal tolerance. This has been proven as a common method to elicit cardiovascular abnormalities not present at rest. However, it’s still unclear how long subjects should stay at this tolerance plateau. And the duration of abnormalities may be too short to detect by human eyes. Thus, we propose:
1. Use VR to guide the induction of exercise stress. VR also brings in mental stress. Thus, the baseline of stress is risen.
2. Use CNN in ECG feature extraction.
3. The effect of stress on human body is accumulative. Thus, we can use LSTM-RNN in ECG abnormalities detection during exercise test. |
| **Motivation:** |
| 1. Previous research experience on VR. And thru literature research, we find VR can provide stable mild-to-moderate mental stimuli.
2. Previous courses and research experience on machine learning.
3. Previous attempt on CVD prescreening proposal. |
| **Objectives:** |
| To develop a smart CVD self-prognosis tool using VR guided exercise stress. |
| **Oral Communication (Type)**/Date |
| Group meetings and presentations on Sep 10th, Oct 10th, Nov 10th, Dec 7th, Dec 10th |
| **Written Presentation (Type)**/Date |
| A report was submitted on Dec 15th |
| **Professional Leadership (State type with brief details)*** |
| He was supervising two undergraduate students’ research. |
| **Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics** |
| His communication skills have improved significantly over the year. He could communicate fairly complex concepts in a concise matter.
especially those requiring critical thinking?

<table>
<thead>
<tr>
<th>Degree Awarded; (Type, date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student efforts beyond the degree</td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


**NOTE: Presentations in courses outside of seminar are not appropriate here.**

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Part 1b**

*Minor – Critical Thinking, Intellectual Depth*

*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong></th>
<th>Jian Ni/Yingtao Jiang</th>
</tr>
</thead>
<tbody>
<tr>
<td>(BOTH names required) If no grad. students, type DNA for student name.</td>
<td></td>
</tr>
</tbody>
</table>

**Critical Thinking-Culminating Exp.**

1/1/2018 – 12/31/2018

1. Stress test is a valid approach using in prognosis and diagnosis of CVD nowadays. Current stress test only includes exercise test and pharmacological stress test.
2. It’s still doubtable how long subjects should stay at max tolerance plateau during exercise test.
3. There are pilot experiments introducing VR as a mental stress test source.
4. For mid-age people, stress level elicited by mental stress has already achieved the reasonable tolerance level.
5. We propose that using VR to guide progressively increasing exercise stress can be a more controllable way to achieve a certain tolerance level or a reasonable time duration to explode cardiovascular abnormalities.

**Bullet Advances in Thesis/Dissertation**

(with regards to critical thinking)

1. we designed a basic ECG feature extraction algorithm;
2. we designed two VR guided exercise test scenes;
3. we designed a basic LSTM ECG detection algorithm.

**Bullet Difficulties or Dead-Ends in Thesis/Dissertation**

(with regards to critical thinking)

1. Mental stress from fear is a controversial topic and is not suggested as a suitable choice by IRB.
2. The metabolic level of every self-designed stress activities should still be measured and quantified in standard METs.

**Other:**

---

**Intellectual Depth (since beginning of program)**

| No.# courses in ECE Major Area (MS* or PhD***) | 3 |
| No.# courses in ECE Minor Area (MS** or PhD***) | 1 |
| No.# course in Second Minor (PhD only) | 0 |
| Pass Qualifier Exam? | Yes at Fall 2017 |
| Pass Comprehensive Exam? | Yes at Fall 2018 |
| Pass Preliminary Exam? | Not yet |

* Number of courses in a major concentration field in ECE
** Number of all remaining courses in ECE
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a
To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component* – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Ming Zhu/Dr. Yingtao Jiang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>2014 Spring</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>Ph.D. / Combination of theory and experiments</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Design on High Performance Nanoscale CMOS Circuits with Low Temperature Sensitivity</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>Thermal-related circuit performance penalty can be significantly reduced by temperature-adaptive power supply and optimized circuit structure.</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Reduce the thermal effect on integrated circuit (IC) delay, and especially improve the circuit performance under high temperature environment</td>
</tr>
<tr>
<td>Objectives:</td>
<td>Reduce the thermal effect on integrated circuit (IC) delay, and especially improve the circuit performance under high temperature environment</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>04/20/2018</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>04/20/2018</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>He led a few undergraduate researchers in their research work.</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td>He is an effective communicator. He can communicate complex, difficulty subject in a matter layman can understand.</td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td>05/12/2018</td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.
NOTE: Presentations in courses outside of seminar are not appropriate here.
***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
### Part 1b
**Minor – Critical Thinking, Intellectual Depth**
*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong> (BOTH names required) <strong>If no grad. students, type DNA for student name.</strong></th>
<th>Ming Zhu/Dr. Yingtao Jiang</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking-Culminating Exp. 1/1/2018 – 12/31/2018</strong></td>
<td>Optimization of logic gate structure can reduce the thermal-induced delay sensitivity as well as improve the circuit delay performance</td>
</tr>
<tr>
<td><strong>Bullet Advances in Thesis/Dissertation (with regards to critical thinking)</strong></td>
<td>Optimization of logic gate structure can further reduce the thermal-induced delay sensitivity as well as improve the circuit delay performance, based on previous research outcome that using temperature-adaptive power supply to reduce the thermal-related circuit delay variations</td>
</tr>
<tr>
<td><strong>Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Intellectual Depth (since beginning of program)

<table>
<thead>
<tr>
<th><em><em>No.## courses in ECE Major Area (MS</em> or PhD</em>*,*<strong>)</strong></th>
<th>ECG 600, ECG 603, ECG 700, ECG 704, ECG 709</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No.## courses in ECE Minor Area (MS</strong>,** or PhD**,*<strong>)</strong></td>
<td>ECG 666, ECG 760, ECG 762</td>
</tr>
<tr>
<td><strong>No.## course in Second Minor (PhD only)</strong></td>
<td>CS 677, CS 747, CS 758</td>
</tr>
<tr>
<td><strong>Pass Qualifier Exam?</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Pass Comprehensive Exam?</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Pass Preliminary Exam?</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Number of courses in a major concentration field in ECE
** Number of all remaining courses in ECE
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership

ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a

To ease the burden of assessment, complete the form below for each student that you have taken the roll of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component* – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Neha Raste/Shahram Latifi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Fall 2015</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) / Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>MS Thesis</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Analysis of Machine Learning (ML)/Deep Learning (DL) Techniques on parallel architecture like GPU/GPGPUs</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>We hypothesize that with ridding of dependence between neurons (learning units), learning of features from samples becomes faster, and possibility of real –time learning for the purpose of classfication, identification etc. improves noticeably.</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Classification is time consuming and tedious</td>
</tr>
<tr>
<td>Objectives:</td>
<td>To automate the classification process</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>None</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>None</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>None</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td>Student has postponed her graduation to a later time due to being a full-time employee. Her communication skills are very good and she can explain and analyze difficult topics in machine learning very well.</td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td></td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td>Student has a full-time job as a programmer in town.</td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


Part 1b
| **Student Name/Adviser Name:**  
(BOTH names required) **If no grad. students, type DNA for student name.** | Neha Raste/Shahram Latifi |
|---|---|
| **Critical Thinking-Culminating Exp.**  
1/1/2018 – 12/31/2018 | None |
| Bullet Advances in Thesis/Dissertation  
(with regards to critical thinking) | Ran additional simulations on labeled data |
| Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) | Difficult to find labeled data for training |
| Other: | None |
| **Intellectual Depth (since beginning of program)** | N/A |
| No.# courses in ECE Major Area (MS*  
or PhD*** | N/A |
| No.# courses in ECE Minor Area  
(MS** or PhD*** | N/A |
| No.# course in Second Minor (PhD only) | N/A |
| Pass Qualifier Exam? | N/A |
| Pass Comprehensive Exam? | N/A |
| Pass Preliminary Exam? | N/A |

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

**Part 1a**
To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). *If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.*

**Research Component** – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Carlos Camacho/Shahram Latifi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Fall 2013</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) / Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>MS Thesis</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Target Detection using UWB radar</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>The type of materials can be identified by processing the radar signals.</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Remote identification of the objects is extremely useful</td>
</tr>
<tr>
<td>Objectives:</td>
<td>To remotely identify the size and type of objects</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>None</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>None</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>He served as a TA instructing different labs in the department.</td>
</tr>
</tbody>
</table>

Comment on any peer review of the critical thinking problem. **Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?**

<table>
<thead>
<tr>
<th>Degree Awarded; (Type, date)</th>
<th>Student has postponed his graduation to a later time due to being a full-time employee. His communication skills are very good and she can explain and analyze difficult topics in machine learning very well.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student efforts beyond the degree</td>
<td>Student has a full-time job as a programmer in town.</td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.
**NOTE: Presentations in courses outside of seminar are not appropriate here.
Part 1b  
Minor – Critical Thinking, Intellectual Depth  
*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Carlos Camacho/Shahram Latifi</th>
</tr>
</thead>
</table>
| **Critical Thinking-Culminating Exp.**  
1/1/2018 – 12/31/2018 | Challenges in setting up the experiments (Radar and Antenna Design) |
| Bullet Advances in Thesis/Dissertation (with regards to critical thinking) | Made progress in having the most part of the experiments in place. |
| Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) | Difficulty in finding sample materials and building custom radar for experiments. |
| Other: | None |

<table>
<thead>
<tr>
<th>Intellectual Depth (since beginning of program)</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.# courses in ECE Major Area (MS* or PhD***):</td>
<td>N/A</td>
</tr>
<tr>
<td>No.# courses in ECE Minor Area (MS** or PhD***):</td>
<td>N/A</td>
</tr>
<tr>
<td>No.# course in Second Minor (PhD only):</td>
<td>N/A</td>
</tr>
<tr>
<td>Pass Qualifier Exam?</td>
<td>N/A</td>
</tr>
<tr>
<td>Pass Comprehensive Exam?</td>
<td>N/A</td>
</tr>
<tr>
<td>Pass Preliminary Exam?</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring originality, critical analyses, and expertise
ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2015 just complete the first three entries and continue to Part 1b and 2.

Research Component* – Communication and Leadership– 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>Shahab Tayeb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Spring 2015</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>PhD Dissertation- Theoretical and Experimental</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Securing Internet of Things</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>It is possible to use existing technologies to achieve a highly secured platform for cyberphysical systems.</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Security is important and Internet of Things is increasingly becoming prevalent.</td>
</tr>
<tr>
<td>Objectives:</td>
<td>To develop an additional security layer to existing layers in the internet hierarchy.</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>Dissertation/Summer 2018</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>Dissertation/Summer 2018</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>Mentored undergraduate students, participated in the NSF EPSCoR</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem</td>
<td>Cisco Technical Staff, Advisor, Graduate Committee Members, CS Faculty</td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td>PhD, August 2018</td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td>Giving invited lectures in computer networks classes.</td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.

NOTE: Presentations in courses outside of seminar are not appropriate here.

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary and oral defense)
**Part 1b**  
*Minor – Critical Thinking, Intellectual Depth*  
*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Critical Thinking-Culminating Exp.</strong></th>
<th><strong>1/1/2018 – 12/31/2018</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Name/Adviser Name:</td>
<td>Shahab Tayeb/Shahram Latifi</td>
</tr>
<tr>
<td>(BOTH names required) If no grad.</td>
<td></td>
</tr>
<tr>
<td>students, type DNA for student name.</td>
<td></td>
</tr>
<tr>
<td><strong>Bullet Advances in Thesis/Dissertation (with regards to critical thinking)</strong></td>
<td><strong>Adding security to the network layer</strong></td>
</tr>
<tr>
<td><strong>Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)</strong></td>
<td><strong>Simulation of bulky data takes a long time to complete.</strong></td>
</tr>
<tr>
<td>Other:</td>
<td>NOne</td>
</tr>
</tbody>
</table>

**Intellectual Depth (since beginning of program)**

| **No.# courses in ECE Major Area (MS* or PhD*****))** | **4** |
| **No.# courses in ECE Minor Area (MS** or PhD**)** | **2** |
| **No.# course in Second Minor (PhD only)** | **3** |
| **Pass Qualifier Exam?** | **Yes** |
| **Pass Comprehensive Exam?** | **Yes** |
| **Pass Preliminary Exam?** | **Yes** |

* Number of courses in a major concentration field in ECE
** Number of all remaining courses in ECE
*** Number of courses includes both MS and PhD programs together
**UNLV Outcome Assessed:** Activities requiring originality, critical analyses, and expertise  
**ECE Department Major Assessment:** Communication and Leadership  
**ECE Department Minor Assessment:** Critical Thinking  
**ECE Department Minor Assessment:** Intellectual Depth  

*Part 1a*

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). **If a student entered the graduate program in the Fall of 2015 just complete the first three entries and continue to Part 1b and 2.**

**Research Component** – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Lina Chato</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted</td>
<td>Spring 2016</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>PhD Dissertation- Theoretical and Experimental</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation</td>
<td>Automated Classification Algorithms of Brain MRI</td>
</tr>
</tbody>
</table>
| Hypothesis | 1. Type and number of features affect the accuracy and the speed of the classification process.  
2. The noise affects badly on the classification process  
Parameters’ optimization of machine learning is needed. |
| Motivation | Manual classification and labeling of data is expensive. |
| Objectives | To develop an automated classification system |
| Oral Communication (Type)**/Date | None |
| Written Presentation (Type)**/Date | None |
| Professional Leadership (State type with brief details)*** | Mentored undergraduate students, participated in the NSF EPSCoR, Lab supervisor |
| Comment on any peer review of the critical thinking problem | Engaged in interdisciplinary work with neurologists in school of medicine |
| Degree Awarded; (Type, date) | PhD, Fall 2020 (Tentative) |
| Student efforts beyond the degree | TA activities. |

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.  

**NOTE:** Presentations in courses outside of seminar are not appropriate here.  
*** Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary and oral defense)
### Part 1b
**Minor – Critical Thinking, Intellectual Depth**
*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong></th>
<th>Lina Chato/Shahram Latifi</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullet Advances in Thesis/Dissertation (with regards to critical thinking)</td>
<td>Collection of MRI of the brain</td>
</tr>
<tr>
<td>Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)</td>
<td>Lack of labeled data</td>
</tr>
</tbody>
</table>

| **Other:** | |
|------------| |

| **Intellectual Depth (since beginning of program):** | |
|-----------------------------------------------------| |
| No. # courses in ECE Major Area (MS* or PhD***)    | 4 |
| No. # courses in ECE Minor Area (MS** or PhD***)    | 2 |
| No. # course in Second Minor (PhD only)             | 2 |
| Pass Qualifier Exam?                                | Yes |
| Pass Comprehensive Exam?                            | Yes |
| Pass Preliminary Exam?                              | No |

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice.

ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a
To ease the burden of assessment, complete the form below for each student that you have taken the roll of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component* – Communication and Leadership
– 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong></th>
<th>Zhao Fu/Mei Yang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Fall 2015</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) / Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>PhD</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Wastewater discharge quality prediction based on ANFIS models</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>Combing correlated parameters and time-series data helps improving prediction accuracy</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Given the limited monitored parameters in wastewater quality sampling data, how to improve the prediction accuracy?</td>
</tr>
<tr>
<td>Objectives:</td>
<td>To improve prediction accuracy for wastewater quality data</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>N/A</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>N/A</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>Zhao studied fuzzy time series and ANFIS models with time-series data. He conducted experiments and confirmed that combing correlated parameters and time-series data helps improving prediction accuracy. His writing is ok. Need improve his self-motivation in research and communication skills. His progress is kind of slow.</td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


NOTE: Presentations in courses outside of seminar are **not appropriate here**.

*** Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense).
**Part 1b**

*Minor – Critical Thinking, Intellectual Depth*

*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong> (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Zhao Fu/Mei Yang</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking-Culminating Exp. 1/1/2018 – 12/31/2018</strong></td>
<td>Zhao did research on wastewater quality prediction. He proposed a complete prediction system based on ANFIS model. He also proposed the input parameter and network structure selection schemes and using stratified sampling to improve the prediction quality.</td>
</tr>
</tbody>
</table>
| **Bullet Advances in Thesis/Dissertation (with regards to critical thinking)** | • Published one conference  
• Submitted one journal paper  
• One journal paper is under preparation |
| **Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)** | • Lacking self-motivation on research  
• Need be open-minded |
| **Other:** | |
| **Intellectual Depth (since beginning of program)** | |
| **No. # courses in ECE Major Area (MS* or PhD***)** | 5 |
| **No. # courses in ECE Minor Area (MS** or PhD***)** | 3 |
| **No. # course in Second Minor (PhD only)** | 3 |
| **Pass Qualifier Exam?** | Y |
| **Pass Comprehensive Exam?** | Y |
| **Pass Preliminary Exam?** | N |

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
**Part 1a**

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). *If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.*

*Research Component – Communication and Leadership – 1/1/2018 – 12/31/2018*

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Yang Jiao/Mei Yang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Fall 2017</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>PhD</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Detection and tracking of proteins in embryo using 3D CNN architectures</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>For tracking proteins in both space and time domains, 3D CNN has advantage than 2D CNN</td>
</tr>
<tr>
<td>Motivation:</td>
<td>The irregular changes of proteins in shape and volume impose big challenge in tracking</td>
</tr>
<tr>
<td>Objectives:</td>
<td>To track proteins in embryo and analyze the patterns of their movement</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>N/A</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>N/A</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td></td>
</tr>
</tbody>
</table>

**Comment on any peer review of the critical thinking problem.** *Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?*

Yang studied different 2D and 3D CNN architectures and proposed a novel method to track proteins. He conducted large amount of experiments and compared with existing schemes. He is very active in research. His has excellent communication skills. His writing is good. He is the most self-motivated and hard-working graduate student in our lab.

*If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


NOTE: Presentations in courses outside of seminar are not appropriate here.

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Part 1b**  
*Minor – Critical Thinking, Intellectual Depth*  
*After Completion, continue to Part 2*  

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Yang Jiao/Mei Yang</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking-Culminating Exp.</strong></td>
<td>Yang’s research is focused on detection and tracking of objects in microscope images using machine learning approaches. In Spring 2018, he completed the FOA project on quantification of white blood cells in injured muscles. He proposed an automatic quantification system featuring the hybrid LIOtsu segmentation and customized CNN classification approach. Starting from Summer 2018, he worked on the detection and tracking proteins in embryo. He proposed a novel tracking method based on 3D CNN architecture. He is superior in critical thinking and very open-minded. He is willing to study new methods to improve his research skills.</td>
</tr>
<tr>
<td>1/1/2018 – 12/31/2018</td>
<td></td>
</tr>
</tbody>
</table>

**Bullet Advances in Thesis/Dissertation (with regards to critical thinking)**  
- Published two conference papers  
- Submitted one journal paper  
- One journal paper is under preparation  

**Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)**  

**Other:**  

---

**Intellectual Depth (since beginning of program)**  

| No.# courses in ECE Major Area (MS* or PhD***) | 5 |
| No.# courses in ECE Minor Area (MS** or PhD***) | 3 |
| No.# course in Second Minor (PhD only) | 3 |

- Pass Qualifier Exam? Y  
- Pass Comprehensive Exam? N  
- Pass Preliminary Exam? N  

---

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

**Research Component** – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong> (BOTH names required)</th>
<th>Binayak Tiwari/Mei Yang</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year Admitted:</strong></td>
<td>Fall 2016</td>
</tr>
<tr>
<td><strong>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination):</strong></td>
<td>PhD</td>
</tr>
<tr>
<td><strong>Tentative Title of Thesis/Dissertation:</strong></td>
<td>Study on hardware trojans in networks-on-chip</td>
</tr>
<tr>
<td><strong>Hypothesis:</strong></td>
<td>Hardware trojans towards multicasting traffic is more effective.</td>
</tr>
<tr>
<td><strong>Motivation:</strong></td>
<td>Hardware trojans in networks-on-chip impose significant security challenges</td>
</tr>
<tr>
<td><strong>Objectives:</strong></td>
<td>Propose hardware trojan attacks on multicast traffic and countermeasures to this type of attacks.</td>
</tr>
<tr>
<td><strong>Oral Communication (Type)</strong>/<strong>Date:</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Written Presentation (Type)</strong>/<strong>Date:</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Professional Leadership (State type with brief details):</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
<td>Binayak has good communication and writing skills. He attended the college graduate poster competition in Spring 2018. His presentation was well done.</td>
</tr>
<tr>
<td><strong>Degree Awarded; (Type, date):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Student efforts beyond the degree:</strong></td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.

**NOTE:** Presentations in courses outside of seminar are not appropriate here.

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
Part 1b
Minor – Critical Thinking, Intellectual Depth
After Completion, continue to Part 2

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Binayak Tiwari/Mei Yang</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking-Culminating Exp.</strong></td>
<td>Binayak did research on hardware Trojan (HT) attacks on multicast traffic in networks-on-chip. He proposed to hijack the temperature information and launch the HT attacks to hot spot nodes. He also proposed the countermeasure to this type of attacks.</td>
</tr>
<tr>
<td>1/1/2018 – 12/31/2018</td>
<td></td>
</tr>
</tbody>
</table>

**Bullet Advances in Thesis/Dissertation (with regards to critical thinking)**
- Published one conference
- One journal paper is under preparation

**Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)**
- Slow in progress
- Lacking in-depth research

**Other:**

**Intellectual Depth (since beginning of program)**

| No. # courses in ECE Major Area (MS* or PhD***) | 5 |
| No. # courses in ECE Minor Area (MS** or PhD***) | 3 |
| No. # course in Second Minor (PhD only) | 3 |
| Pass Qualifier Exam? | Y |
| Pass Comprehensive Exam? | N |
| Pass Preliminary Exam? | N |

* Number of courses in a major concentration field in ECE
** Number of all remaining courses in ECE
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership

ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Arsal Syed / Brendan Morris</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Fall 2017</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) / Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>PhD / Theory + Experimental</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>NA : Deep Learning for Predicting Roadway Trajectories</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>Understanding of human intentions requires considering external factors which influence decision making</td>
</tr>
<tr>
<td>Motivation:</td>
<td>Automated vehicles/robots will need to understand human behaviors to be able to effectively interact in a natural and acceptable manner.</td>
</tr>
<tr>
<td>Objectives:</td>
<td>Develop deep learning framework to predict trajectories for all road users in a self-driving vehicle scene based on infrastructure learning.</td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>• Semester lab meeting presentations: 3/23/2018, 6/1, 9/14</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>• Paper submission in early 2019 for 2019 Intelligent Vehicles Symposium (started at end of 2018)</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>NA</td>
</tr>
</tbody>
</table>

Comment on any peer review of the critical thinking problem. **Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?**

Arsal has been a bit of challenge because for most of 2018 it did not seem that he was effective with research, technical nor communication. Presentations were weak and informal communication with advisor showed he lacked understanding of material. Major improvements beginning in November of 2018 has resulted in a reasonable paper for submission. This paper did require substantial editorial work though so his communication is still mediocre.

Degree Awarded; (Type, date)

Student efforts beyond the degree

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Part 1b**  
*Minor – Critical Thinking, Intellectual Depth*  
*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th>Student Name/Adviser Name:</th>
<th>Arsal Syed / Brendan Morris</th>
</tr>
</thead>
</table>

| Critical Thinking-Culminating Exp.  
1/1/2018 – 12/31/2018 |  |
|-------------------------|-----------------------------|
| Bullet Advances in Thesis/Dissertation  
(with regards to critical thinking) |  
• Modified SS-LSTM to develop a Social Scene Semantics LSTM  
(SScene-LSTM)  
→ this was a big breakthrough for him |
| Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) |  
• Lots of difficulties  
• Initial LSTM formulation was terrible  
• Was side-tracked many times and only now is focusing closely and making progress. |

<table>
<thead>
<tr>
<th>Other:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Intellectual Depth (since beginning of program)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No.# courses in ECE Major Area (MS* or PhD***)</td>
<td>3</td>
</tr>
<tr>
<td>No.# courses in ECE Minor Area (MS** or PhD***)</td>
<td>1</td>
</tr>
<tr>
<td>No.# course in Second Minor (PhD only)</td>
<td>2</td>
</tr>
<tr>
<td>Pass Qualifier Exam?</td>
<td>YES</td>
</tr>
<tr>
<td>Pass Comprehensive Exam?</td>
<td>NO</td>
</tr>
<tr>
<td>Pass Preliminary Exam?</td>
<td>NO</td>
</tr>
</tbody>
</table>

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

Research Component – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required)</th>
<th>DNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td></td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td></td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td></td>
</tr>
<tr>
<td>Hypothesis:</td>
<td></td>
</tr>
<tr>
<td>Motivation:</td>
<td></td>
</tr>
<tr>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td>Oral Communication (Type)*/Date</td>
<td></td>
</tr>
<tr>
<td>Written Presentation (Type)*/Date</td>
<td></td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td></td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td></td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td></td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.

NOTE: Presentations in courses outside of seminar are not appropriate here.

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
### Part 1b

**Minor – Critical Thinking, Intellectual Depth**

*After Completion, continue to Part 2*

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong> (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>DNA</th>
</tr>
</thead>
</table>
| **Critical Thinking-Culminating Exp.**  
1/1/2018 – 12/31/2018 |  |
| Bullet Advances in Thesis/Dissertation (with regards to critical thinking) |  |
| Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking) |  |
| Other: |  |

**Intellectual Depth (since beginning of program)**

<table>
<thead>
<tr>
<th>No.# courses in ECE Major Area (MS* or PhD***)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No.# courses in ECE Minor Area (MS** or PhD***)</td>
<td></td>
</tr>
<tr>
<td>No.# course in Second Minor (PhD only)</td>
<td></td>
</tr>
<tr>
<td>Pass Qualifier Exam?</td>
<td></td>
</tr>
<tr>
<td>Pass Comprehensive Exam?</td>
<td></td>
</tr>
<tr>
<td>Pass Preliminary Exam?</td>
<td></td>
</tr>
</tbody>
</table>

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* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
** Number of courses includes both MS and PhD programs together
**UNLV Outcome Assessed:** Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

**ECE Department Major Assessment:** Communication and Leadership

**ECE Department Minor Assessment:** Critical Thinking

**ECE Department Minor Assessment:** Intellectual Depth

**Part 1a**

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). *If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.*

---

<table>
<thead>
<tr>
<th>Research Component* – Communication and Leadership</th>
<th>– 1/1/2018 – 12/31/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student Name/Adviser Name:</strong> (BOTH names required) If no grad. students, type DNA for student name.</td>
<td>Manisha Ghimire/Emma Regentova</td>
</tr>
<tr>
<td><strong>Year Admitted:</strong></td>
<td>2018</td>
</tr>
<tr>
<td><strong>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination)</strong></td>
<td>PhD (Combination of theory and numerical modeling)</td>
</tr>
<tr>
<td><strong>Tentative Title of Thesis/Dissertation:</strong></td>
<td>Methods of embedded DSP and data mining for memory and time intensive methods.</td>
</tr>
<tr>
<td><strong>Hypothesis:</strong></td>
<td>There are certain DSP methods and algorithms that consume substantial memory and computational power. The dissertation is concerned with balancing these characteristics by proper interface and memory allocation strategies.</td>
</tr>
<tr>
<td><strong>Motivation:</strong></td>
<td>Need in implementing on Space Mission computational platforms.</td>
</tr>
<tr>
<td><strong>Objectives:</strong></td>
<td>Improve cost and performance of embedded implementation of DSP and data mining methods.</td>
</tr>
<tr>
<td><strong>Oral Communication (Type)</strong>*/Date</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Written Presentation (Type)</strong>*/Date</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Professional Leadership (State type with brief details)</strong>*</td>
<td>The student is a TA, and received good evaluation by the lab director</td>
</tr>
<tr>
<td><strong>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Degree Awarded; (Type, date)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Student efforts beyond the degree</strong></td>
<td></td>
</tr>
</tbody>
</table>

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


**NOTE:** Presentations in courses outside of seminar are **not appropriate here.**

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong>&lt;br&gt;(BOTH names required) <strong>If no grad. students, type DNA for student name.</strong></th>
<th>Manisha Ghimire/Emma Regentova</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking-Culminating Exp.</strong>&lt;br&gt;1/1/2018 – 12/31/2018</td>
<td></td>
</tr>
<tr>
<td>Bullet Advances in Thesis/Dissertation (with regards to critical thinking)</td>
<td>Almost completed the design of a circuit for implementing image segmentation with efficient data buffering, memory allocation and pipelining</td>
</tr>
<tr>
<td>Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)</td>
<td>The student is a direct PhD. There were difficulties in understanding how to document and plan numerical experiments.</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td><strong>Intellectual Depth (since beginning of program)</strong></td>
<td></td>
</tr>
<tr>
<td>No.# courses in ECE Major Area (MS* or PhD***)</td>
<td>3 taken 1 enrolled (Computer engineering)</td>
</tr>
<tr>
<td>No.# courses in ECE Minor Area (MS** or PhD***)</td>
<td>1 taken 1 enrolled (Signal processing)</td>
</tr>
<tr>
<td>No.# course in Second Minor (PhD only)</td>
<td>1 enrolled (Communications + CS)</td>
</tr>
<tr>
<td>Pass Qualifier Exam?</td>
<td>Yes</td>
</tr>
<tr>
<td>Pass Comprehensive Exam?</td>
<td>No</td>
</tr>
<tr>
<td>Pass Preliminary Exam?</td>
<td>No</td>
</tr>
</tbody>
</table>

* Number of courses in a major concentration field in ECE<br>** Number of all remaining courses in ECE<br>*** Number of courses includes both MS and PhD programs together
### Part 1a

To ease the burden of assessment, complete the form below for each student that you have taken the roll of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). **If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.**

#### Research Component – Communication and Leadership – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong> (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Carlos Lemus/Emma Regentova</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year Admitted:</strong></td>
<td>Fall 2018</td>
</tr>
<tr>
<td><strong>Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination):</strong></td>
<td>MS/ Combination of theory and experiment</td>
</tr>
<tr>
<td><strong>Tentative Title of Thesis/Dissertation:</strong></td>
<td>Real-time implementation of multistage feature extraction and interpolation methods</td>
</tr>
<tr>
<td><strong>Hypothesis:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Motivation:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Objectives:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Oral Communication (Type)</strong>/Date</td>
<td></td>
</tr>
<tr>
<td><strong>Written Presentation (Type)</strong>/Date</td>
<td></td>
</tr>
<tr>
<td><strong>Professional Leadership (State type with brief details)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Comment on any peer review of the critical thinking problem. Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Degree Awarded; (Type, date)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Student efforts beyond the degree</strong></td>
<td></td>
</tr>
</tbody>
</table>

*If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


**NOTE: Presentations in courses outside of seminar are not appropriate here.**

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
<table>
<thead>
<tr>
<th>Student Name/Adviser Name:</th>
<th>Carlos Lemus/Emma Regentova</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking-Culminating Exp.</strong></td>
<td></td>
</tr>
<tr>
<td>1/1/2018 – 12/31/2018</td>
<td></td>
</tr>
<tr>
<td>Bullet Advances in Thesis/Dissertation (with regards to critical thinking)</td>
<td>Designed a circuit for bi-cubic interpolation with an efficient windowing method.</td>
</tr>
<tr>
<td>Bullet Difficulties or Dead-Ends in Thesis/Dissertation (with regards to critical thinking)</td>
<td>Certain difficulties at first with re-thinking of the algorithm for pipelined memory access</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
<tr>
<td><strong>Intellectual Depth (since beginning of program)</strong></td>
<td></td>
</tr>
<tr>
<td>No.# courses in ECE Major Area (MS* or PhD***)</td>
<td>2 taken (1 enrolled)</td>
</tr>
<tr>
<td>No.# courses in ECE Minor Area (MS** or PhD***)</td>
<td>0 (2 enrolled)</td>
</tr>
<tr>
<td>No.# course in Second Minor (PhD only)</td>
<td></td>
</tr>
<tr>
<td>Pass Qualifier Exam?</td>
<td></td>
</tr>
<tr>
<td>Pass Comprehensive Exam?</td>
<td></td>
</tr>
<tr>
<td>Pass Preliminary Exam?</td>
<td></td>
</tr>
</tbody>
</table>

* Number of courses in a major concentration field in ECE
** Number of all remaining courses in ECE
*** Number of courses includes both MS and PhD programs together
**UNLV Outcome Assessed**: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

**ECE Department Major Assessment**: Communication and Leadership

**ECE Department Minor Assessment**: Critical Thinking

**ECE Department Minor Assessment**: Intellectual Depth

---

**Part 1a**

To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). *If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.*

**Research Component** – Communication and Leadership – 1/1/2018 – 12/31/2018

---

<table>
<thead>
<tr>
<th>Student Name/Adviser Name: (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Vahid Vahidi / Ebrahim Saberinia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Admitted:</td>
<td>Fall / 2014</td>
</tr>
<tr>
<td>Degree (MS course only, MS thesis, PhD) / Type (Theory, Experimental, Numerical Modeling, or Combination)</td>
<td>PhD</td>
</tr>
<tr>
<td>Tentative Title of Thesis/Dissertation:</td>
<td>Channel Estimation and ICI Cancelation in Vehicular Channels of OFDM Wireless Communication Systems</td>
</tr>
<tr>
<td>Hypothesis:</td>
<td>Terrestrial OFDM based systems need to be optimized when they are used to transmit high bandwidth data over high Doppler wireless channels.</td>
</tr>
<tr>
<td>Motivation:</td>
<td></td>
</tr>
<tr>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td>Oral Communication (Type)**/Date</td>
<td>Final Defense/ June 2018</td>
</tr>
<tr>
<td>Written Presentation (Type)**/Date</td>
<td>PhD Dissertation/ Spring 2018</td>
</tr>
<tr>
<td>Professional Leadership (State type with brief details)***</td>
<td>Thought EE 220 in spring 2018</td>
</tr>
<tr>
<td>Comment on any peer review of the critical thinking problem. <strong>Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
<td>Vahid has gotten very good in oral and written presentation of his work as indicated by his committee members and reviewers of his papers. He was able to teach and communicate with students in the class he taught for spring 2018. In his interview for an assistant professor position, he also taught a single class and got positive feedback and an offer for the position.</td>
</tr>
<tr>
<td>Degree Awarded; (Type, date)</td>
<td>PhD, June 2018</td>
</tr>
<tr>
<td>Student efforts beyond the degree</td>
<td>Assistant professor at Hanover College</td>
</tr>
</tbody>
</table>

---

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


NOTE: Presentations in courses outside of seminar are not appropriate here.

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to
community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
**Part 1b**  
*Minor – Critical Thinking, Intellectual Depth*  
*After Completion, continue to Part 2*

| **Student Name/Adviser Name:**  
(BOTH names required) If no grad.  
students, type DNA for student name. | Vahid Vahidi/Ebrahim Saberinia |
|---|---|
| **Critical Thinking-Culminating Exp.**  
1/1/2018 – 12/31/2018 | 

- Introduction of compressed sensing to solve the problem of channel estimation in doppler channel.  
- Introduction of channel coding to enhance the performance of channel estimation in doppler channels |
| **Bullet Advances in Thesis/Dissertation**  
(with regards to critical thinking) | 

DNA |
| **Bullet Difficulties or Dead-Ends in**  
Thesis/Dissertation (with regards to critical thinking) | 

DNA |
| **Other:** | |

---

**Intellectual Depth (since beginning of program)**

| **No. # courses in ECE Major Area (MS*  
or PhD***)** | 6 |
| **No. # courses in ECE Minor Area**  
(MS** or PhD*** ) | 3 |
| **No. # course in Second Minor (PhD only)** | 3 |
| **Pass Qualifier Exam?** | yes |
| **Pass Comprehensive Exam?** | yes |
| **Pass Preliminary Exam?** | yes |

---

* Number of courses in a major concentration field in ECE  
** Number of all remaining courses in ECE  
*** Number of courses includes both MS and PhD programs together
UNLV Outcome Assessed: Activities requiring student engagement in research, scholarship, creative expression, and/or appropriate high-level professional practice

ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 1a
To ease the burden of assessment, complete the form below for each student that you have taken the role of mentor (MS course only option) or adviser (MS thesis or PhD dissertation option). If a student entered the graduate program in the Fall of 2018 or later, just complete the first three entries and continue to Part 1b and 2.

| Student Name/Adviser Name: (BOTH names required) | Nicholas Moya/ S. N. Singh |
| Year Admitted: | 2006 |
| Degree (MS course only, MS thesis, PhD) /Type (Theory, Experimental, Numerical Modeling, or Combination) | MS thesis |
| Tentative Title of Thesis/Dissertation: | LINEAR AND NONLINEAR ADAPTIVE ATTITUDE CONTROL OF ASTEROID-ORBITING SPACECRAFT USING STATE FEEDBACK AND OUTPUT FEEDBACK |
| Hypothesis: | Adaptive laws are expected to control the attitude of spacecraft despite unknown gravitational forces of asteroids |
| Motivation: | Study of asteroids can aid in the origin of solar systems. Asteroids could be source of minerals and resources. Thus for exploration, it is important to control visiting spacecraft in the uncertain environment of asteroids. |
| Objectives: | The objective is to control the attitude of satellite in the unknown environment of asteroids for precise pointing. |
| Oral Communication (Type)**/Date | May 2018 (defense of thesis). |
| Written Presentation (Type)**/Date | "Adaptive Attitude Control of Spacecraft Orbiting Around Asteroids," AIAA SciTech 2019 Forum, January 2019, San Diego, CA. |
| Professional Leadership (State type with brief details)*** | Grading home work assignments |
| Comment on any peer review of the critical thinking problem. **Comment on the quality of the student’s communication and presentation efforts prior to advisor comments, insertions, or editorial changes. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?** | Quality of presentation: Very good |
| Degree Awarded; (Type, date) | M. S. |
| Student efforts beyond the degree | }

* If the student is in the MS course only program, use DNA (Does Not Apply) as a fill-in.


**NOTE: Presentations in courses outside of seminar are not appropriate here.**

***Examples of leadership – Teaching a class, leading a discussion group, hold professional office, intellectual
property presentation, presentations to the community, presentations to K-12, Thesis/dissertation presentation to community outside of UNLV (includes non-UNLV advisory board members at the preliminary & oral defense)
Part 1b
Minor – Critical Thinking, Intellectual Depth
After Completion, continue to Part 2

<table>
<thead>
<tr>
<th><strong>Student Name/Adviser Name:</strong> (BOTH names required) If no grad. students, type DNA for student name.</th>
<th>Nicholas Moya/ S. N. Singh</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Thinking-Culminating Exp.</strong>&lt;br&gt;1/1/2018 – 12/31/2018</td>
<td></td>
</tr>
<tr>
<td><strong>Bullet Advances in Thesis/Dissertation</strong> (with regards to critical thinking)</td>
<td>Designed adaptive attitude control systems for control of asteroid-orbiting spacecraft.</td>
</tr>
<tr>
<td><strong>Bullet Difficulties or Dead-Ends in Thesis/Dissertation</strong> (with regards to critical thinking)</td>
<td>None</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Intellectual Depth (since beginning of program)**

| No. # courses in ECE Major Area (MS* or PhD***) | Completed 5 graduate level classes in control systems area |
| No. # courses in ECE Minor Area (MS** or PhD***) |  |
| No. # course in Second Minor (PhD only) |  |

Pass Qualifier Exam?

Pass Comprehensive Exam?

Pass Preliminary Exam?

* Number of courses in a major concentration field in ECE
** Number of all remaining courses in ECE
*** Number of courses includes both MS and PhD programs together
**Appendix C**

**Faculty Evaluations for 2018**

**Communication and Leadership – Part 2  Graduate Course Assessment**

Faculty Participants (15/18):

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baker</td>
<td>Baghzouz</td>
<td>Jiang</td>
<td>Harris</td>
<td>Kachroo</td>
</tr>
<tr>
<td>Latifi</td>
<td>Morris</td>
<td>Regentova</td>
<td>Saberinia</td>
<td>Singh</td>
</tr>
<tr>
<td>Schill</td>
<td>Sterberud</td>
<td>Yang</td>
<td>Chmaj</td>
<td>Ming Zhu</td>
</tr>
</tbody>
</table>

No Response (3/18)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Das</td>
<td>Muthukumar</td>
<td>Sun</td>
</tr>
</tbody>
</table>
UNLV Outcome Assessed: Activities requiring originality, critical analyses, and expertise
ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

Part 2

This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

| Course Component – Communication and Leadership/Critical Thinking – 1/1/2018 – 12/31/2018 |
|--------------------------------------------------|--------------------------------------------------|
| Course Number/Instructor Name:                    | ECG 740/Yahia Baghzouz                           |
| If did not teach a graduate course, type DNA for course number. |                                                 |
| Course Title:                                    | Computer Analysis Methods for Power Systems      |
| Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem. | Below was one of the homework problem that requires critical thinking: Consider 4 units with specified min and max loading limits, fuel cost characteristics, start-up and shut-down costs. These units are to supply the load specified that is also specified. The problem is to determine the unit commitment policy of the 4 thermal Units. |
| Identify what makes the problem a critical thinking problem | The above unit commitment problem is complex as the solution space is enormous, i.e., there are too many combinations if one attempts the brut-force method, due to “the curse of dimensionality”, and to the fact that the problem consists of integer and continuous variables. |
| Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation. | Students tried different solution techniques including priority listing (heuristic approach), dynamic programming, Lagrangian relaxation, and mixed integer programming. All solutions of these methodologies do not guarantee global optimality, but as close as possible within a reasonable amount of computation time. Overall, all of the students (5 in total) reached a solution that is within 5% of the true solution. |
| Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking? | Each of the above techniques can be highly mathematical. Consequently, each was assigned as individual projects to these students who presented their conceptual thoughts at the end of the semester in the form of power point presentations. It is my opinion that all students did well in their presentations. |
This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

<table>
<thead>
<tr>
<th>Course Component – Communication and Leadership/Critical Thinking – 1/1/2018 – 12/31/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Number/Instructor Name:</strong></td>
</tr>
<tr>
<td>If did not teach a graduate course, type DNA for course number.</td>
</tr>
<tr>
<td>Dr. R. J. Baker</td>
</tr>
<tr>
<td><strong>Course Title:</strong></td>
</tr>
<tr>
<td>Mixed-Signal Circuit Design</td>
</tr>
<tr>
<td><strong>Identify ONE complex critical thinking problem</strong></td>
</tr>
<tr>
<td>problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</td>
</tr>
<tr>
<td><strong>Identify what makes the problem a critical thinking problem</strong></td>
</tr>
<tr>
<td><strong>Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.</strong></td>
</tr>
<tr>
<td><strong>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
</tr>
<tr>
<td>Course Number/Instructor Name:</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</td>
</tr>
<tr>
<td>Identify what makes the problem a critical thinking problem</td>
</tr>
<tr>
<td>Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.</td>
</tr>
<tr>
<td>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. <strong>Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
</tr>
</tbody>
</table>
### Course Component – Communication and Leadership/Critical Thinking – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Course Number/Instructor Name: <strong>If did not teach a graduate course, type DNA for course number.</strong></th>
<th>ECG 722 / Dr. R. Jacob Baker</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Title:</strong></td>
<td>Mixed-Signal Circuit Design</td>
</tr>
<tr>
<td>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</td>
<td>One complex problem would be identifying data converter that use different delta-sigma modulation topologies.</td>
</tr>
<tr>
<td>Identify what makes the problem a critical thinking problem</td>
<td>Problem compels student to design, test, and characterize the topologies in order to know the advantages and disadvantages.</td>
</tr>
<tr>
<td>Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.</td>
<td>Problem was handled by solving homework problems as well as utilizing one topology in a class project then comparing the project to a different ideal topology to see the benefits and tradeoffs of each.</td>
</tr>
<tr>
<td>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. <strong>Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
<td>Students were assigned a class project that required them to write a report expressing their project design and analysis process. This effectively displays the students’ communication ability and quality as well as their critical thinking process.</td>
</tr>
</tbody>
</table>
### Course Component: Communication and Leadership/Critical Thinking – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Course Number/Instructor Name: If did not teach a graduate course, type DNA for course number.</th>
<th>ECG617 / Grzegorz Chmaj</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Title:</td>
<td>Internet of Things Systems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</th>
<th>The IoT system in which sensors are connected to nodes and students need to determine the cloud usage and application for this system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify what makes the problem a critical thinking problem</td>
<td>Student needs to evaluate the cloud solutions and choose the one that will fit the specific need of the project</td>
</tr>
</tbody>
</table>

| Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation. | Students analyzed available solutions at the cloud side, as well as the software components needed to interface the local hardware with the cloud. Performance was measured by evaluating how much the solution selected by a student matches the needs of the application (in terms of software tools, on-cloud tools available, analysis engines etc.). Solving this critical problem required extensive analysis of various solutions. |
| Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. **Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?** | The thoughts were communicated verbally during the cloud solution evaluation stage. Students were very clear in their expressions and their statements were organized, as they were very technical and focusing only on the crucial parts and technical aspects of the topic. |
This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

<table>
<thead>
<tr>
<th>Course Component – <strong>Communication and Leadership/Critical Thinking</strong> – 1/1/2018 – 12/31/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Number/Instructor Name:</strong> DNA</td>
</tr>
<tr>
<td><strong>Course Title:</strong></td>
</tr>
<tr>
<td><strong>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</strong></td>
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<td><strong>Identify what makes the problem a critical thinking problem</strong></td>
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<td><strong>Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.</strong></td>
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<tr>
<td><strong>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc.</strong></td>
</tr>
<tr>
<td><strong>Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</strong></td>
</tr>
</tbody>
</table>
**UNLV Outcome Assessed:** Activities requiring originality, critical analyses, and expertise

**ECE Department Major Assessment:** Communication and Leadership

**ECE Department Minor Assessment:** Critical Thinking

**ECE Department Minor Assessment:** Intellectual Depth

---

**Part 2**

This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

**Course Component** – **Communication and Leadership/Critical Thinking** – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Course Number/Instructor Name: If did not teach a graduate course, type DNA for course number.</th>
<th>ECG 703</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Title:</td>
<td>Machine Learning with Applications</td>
</tr>
</tbody>
</table>

**Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.**

<table>
<thead>
<tr>
<th>Identify ONE complex critical thinking problem</th>
<th>How would one characterize the noise in order to avoid overfitting?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The answer would require knowledge, creativity and ability to collect and interpret the available data</td>
<td></td>
</tr>
</tbody>
</table>

**Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.**

<table>
<thead>
<tr>
<th>Address in detail how your class handled the problem.</th>
<th>The class size is small (7) and the results may not be statistically significant. Students generally performed well in addressing the problem notwithstanding they came up with different results. Some started out with a theoretical analysis and tried to confirm the result through simulation. Some started with a simulation to get an idea for what the results would turn out to be.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students were assigned term projects and were required to give a presentation on their work. They performed very well in class by adequately preparing a survey around the topic they chose and presenting recommendation for future directions.</td>
<td></td>
</tr>
</tbody>
</table>

**Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?**

<table>
<thead>
<tr>
<th>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</th>
<th>Students were assigned term projects and were required to give a presentation on their work. They performed very well in class by adequately preparing a survey around the topic they chose and presenting recommendation for future directions.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

<table>
<thead>
<tr>
<th>Course Component – Communication and Leadership/Critical Thinking</th>
<th>– 1/1/2018 – 12/31/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Number/Instructor Name:</strong> If did not teach a graduate course, type DNA for course number.</td>
<td>ECG 704</td>
</tr>
<tr>
<td><strong>Course Title:</strong></td>
<td>Coding Appl Comp &amp; Comm</td>
</tr>
<tr>
<td><strong>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</strong></td>
<td>Marriage of two fields, namely systems reliability and machine learning is the focus here.</td>
</tr>
<tr>
<td><strong>Identify what makes the problem a critical thinking problem</strong></td>
<td>Machine learning techniques can predict future patterns based on the history of events given to them. How can we use their power to predict and possibly prevent channel errors?</td>
</tr>
<tr>
<td><strong>Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.</strong></td>
<td>Students were required to choose an application and within that application, investigate and select an appropriate machine learning technique to increase systems reliability. Students are performing at levels close to each other. They are learning how to use built-in functions in MATLAB for the application they chose. They also learn how simulate their experiments and analyze the results.</td>
</tr>
<tr>
<td><strong>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc.</strong></td>
<td>Students were required to write a term paper and each give a 15-minute presentation of their work to the entire class. During the Q&amp;A session, it is found that the students’ grasp of the subject and understanding each others’ presentation is at an acceptable level.</td>
</tr>
</tbody>
</table>

**Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?**
### Part 2

This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

#### Course Component – Communication and Leadership/Critical Thinking – 1/1/2018 – 12/31/2018

<table>
<thead>
<tr>
<th>Course Component</th>
<th>ECG 600 – Computer Communication Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Number/Instructor Name:</td>
<td>If did not teach a graduate course, type DNA for course number.</td>
</tr>
<tr>
<td>Course Title:</td>
<td>Identify the spanning tree which minimizes the path cost from one source node to each of destination in one multicast session. On the spanning tree, is the total hop cost experienced by the multicast packet minimum?</td>
</tr>
<tr>
<td>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</td>
<td>Identify what makes the problem a critical thinking problem</td>
</tr>
<tr>
<td>Identify what makes the problem a critical thinking problem</td>
<td>This question needs understanding of definition of minimal path between two nodes, multicast tree, and total hop count on a multicast tree.</td>
</tr>
<tr>
<td>Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation.</td>
<td>Some students assumed that a multicast tree with minimal cost path from the source node to each destination must have the minimal total hop cost. Only one student calculated the actual total hop count and found that there was other trees have less total hop count. Most of students lacked the concept of multicast routing. More explanation on the different definitions of multicast trees would be helpful.</td>
</tr>
<tr>
<td>Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. Comment on the quality of the students’ communication and presentation efforts. Can the student express in words (written and oral) difficult conceptual topics especially those requiring critical thinking?</td>
<td>Most of students could communicate and write their thoughts well. Some students had critical thinking skills.</td>
</tr>
</tbody>
</table>
UNLV Outcome Assessed: Activities requiring originality, critical analyses, and expertise
ECE Department Major Assessment: Communication and Leadership
ECE Department Minor Assessment: Critical Thinking
ECE Department Minor Assessment: Intellectual Depth

**Part 2**

This section must be filled out for each graduate class taught in the academic year; 1/1/2018 – 12/31/2018. Independent study and special topics classes need to be treated as any regular course on this form.

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<td>Course Title:</td>
<td>Random Processes in Engineering Problem</td>
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<td>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</td>
<td>In second midterm a deterministic signal was given as $g(t)$ and a random process was defined as $x(t)=g(t-T)$ where $T$ is an exponentially distributed random variable. Students were to determine if $x(t)$ is wide sense stationary (WSS) or not.</td>
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<td>Identify what makes the problem a critical thinking problem</td>
<td>The answer to the problem requires students to calculate the mean and autocorrelation function of $x(t)$. To do so it requires that they find joint distribution for $x(t)$ and $x(t+s)$. They should do this by relating the events in $x(t)$ domain to events in $T$ domain which means they need to put all of their knowledge together to solve the problem.</td>
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<td>While most of the students were able to find the mean function, a little more than half of the class were in the right track toward finding the autocorrelation function. Close to third solved the problem and another third partially solved it.</td>
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<td>On average the written skills of the class were below what is expected from graduate students. When reading their answers, I should make every attempt to follow their thought processes and how they go from point A to B.</td>
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|---|---|
| **Course Number/Instructor Name:**  
*If did not teach a graduate course, type DNA for course number.* | **ECG 680 / Stubberud** |
| **Course Title:** | **Digital Signal Processing** |
| Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem. | Students were asked to implement a decimation and interpolation system in Matlab. |
| Identify what makes the problem a critical thinking problem | Decimation and interpolation can be implemented several different ways in Matlab. Students were also required to determine filter specifications and implementation for both decimation and interpolation systems. |
| Address in detail how your class handled the problem. Concrete statements or direct measurements of student performance are sought. Technical terms may be used. Be as specific as possible. If you like, break the class up into two sections. One half of the class is composed of students with the highest half of the course grades. The second half of the class is composed of students with the lower half of the course grades. Explain how the upper and lower halves attacked the problem. If a different division is more suitable for your course, please state the division and provide your explanation. | The students Matlab code was not efficient but it worked. Their selection of filters was appropriate but the students did not recognize how to combine two lowpass filters connected in series into a single lowpass filter. |
| Comment on how effective your class is in communicating their thoughts (in writing and/or verbally) regarding the critical thinking problem: clarity, organized, readable, can express conceptual thoughts (analytically, orally, and/or in written English), etc. | Their ability to present their design and design decisions was average to below average. |
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<td><strong>Identify ONE complex critical thinking problem that the students in your class were required to address. The problem could be an examine problem or a homework problem with a complex solution or an open-end problem.</strong></td>
<td>Students were asked to design a linear phase FIR filter that met certain specifications and determine the filter’s SNR for a 16 bit implementation.</td>
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<td><strong>Identify what makes the problem a critical thinking problem</strong></td>
<td>The students have several design criterion that can be met in different ways. Also the filter can be implemented in different ways. The SNR calculation is a metric that can be used to determine effectiveness of their chosen implementation.</td>
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<td>Students were able to design filters that met the design criteria and determine an appropriate implementation. Their ability to determine the filter’s SNR for a 16 bit architecture met with mixed results.</td>
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