

**Academic Assessment Plan**  
**PhD / Biological & Agricultural Engineering**  
**June 1, 2015**

**Program Goals**

1. Prepare students for independent research to contribute new scientific knowledge of fundamental importance to the fields of Biological Engineering, and
2. Contribute new knowledge of fundamental importance or significantly modify, amplify, or interpret existing knowledge in a new and important manner.

**Student Learning Outcomes (SLO)**

1. Students will make satisfactory progress toward the completion of course requirements in preparation for independent research to contribute new and fundamentally important knowledge to Biological Engineering,
2. Students will be prepared for independent research in Biological Engineering,
3. Students will be prepared to contribute new and fundamentally important knowledge to Biological Engineering,
4. Students will contribute new and fundamentally important knowledge to Biological Engineering or significantly modify, amplify, or interpret existing knowledge in a new and important manner, and
5. Students will be able to communicate effectively in a professional, scientific setting.

**Process for Assessing Each SLO**

1. Timeline:
  - a. Annual Graduate Student Academic Reviews submitted to the Graduate School by June 30.
  - b. Candidacy Examination after approximately two years of graduate study or at the time of completing all required courses, whichever comes first.
  - c. Dissertation Proposal may not occur in the same semester as Candidacy Examination.
  - d. Final Examination (*i.e.*, Final Defense) may not occur in the same semester as Dissertation Proposal.
  - e. Assessment results and analysis presented at Summer Faculty "Retreat" to stimulate discussion about any program (or assessment process) changes.
2. Means of assessment [and desired level of student achievement]:
  - a. SLO-1: Assessed annually with student's coursework, Annual Graduate Student Academic Review, Annual Progress Report, and Exit Review by department head
    - Cumulative GPA [desired level of achievement  $\geq 3.0$ ]
    - Annual Progress Report by student and Annual Graduate Student Academic Review by graduate coordinate in consultation with student advisor [desired level of achievement is "satisfactory"]
    - Exit Review by Department Head [desired level of achievement is "satisfactory"]

b. SLO-2: Assessed with Candidacy Examination and Exit Review

- Student self-assessment of independent research preparation with respect to Comprehension (understanding literature), Design and Application (problem solving), Analysis and Synthesis (support for generalizations; alternative solutions), and Evaluation (validity) [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Advisory Committee members’ assessment of independent research preparation with respect to Comprehension (understanding literature), Design and Application (problem solving), Analysis and Synthesis (support for generalizations; alternative solutions), and Evaluation (validity) [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Exit Review by Department Head [desired level of achievement is “satisfactory”]

c. SLO-3: Assessed with Dissertation Proposal and Exit Review

- Student self-assessment of preparation to contribute new knowledge with respect to Comprehension (understanding literature), Design and Application (problem solving), Analysis and Synthesis (support for generalizations; alternative solutions), and Evaluation (validity) [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Dissertation Committee members’ assessment of preparation to contribute new knowledge with respect to Comprehension (understanding literature), Design and Application (problem solving), Analysis and Synthesis (support for generalizations; alternative solutions), and Evaluation (validity) [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Exit Review by Department Head [desired level of achievement is “satisfactory”]

d. SLO-4: Assessed with Final Examination, Research Publication, and Exit Review

- Student self-assessment of contributing new knowledge with respect to Comprehension (understanding literature), Design and Application (problem solving), Analysis and Synthesis (support for generalizations; alternative solutions), and Evaluation (validity) [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Dissertation Committee members’ assessment of contributing new knowledge with respect to Comprehension (understanding literature), Design and Application (problem solving), Analysis and Synthesis (support for generalizations; alternative solutions), and Evaluation (validity) [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Preparation of research results for publications in professional journals or conference papers in professional meetings [desired level of

achievement is a “submitted”, “in review”, “accepted”, “in press” or “published” journal paper or conference paper]

- Exit Review by Department Head [desired level of achievement is “satisfactory”]

e. SLO-5: Assessed with Candidacy Examination, Dissertation Proposal, Final Examination, Research Presentation and/or Publication, and Exit Review

- Student self-assessment of effective communication [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Committee members’ assessment of effective communication [desired level of achievement is “agree or strongly agree” on closed-form assessments]
- Presentation of research results to local, regional, national, and/or international audiences through publications in professional journals or conference papers or abstracts in professional meetings [desired level of achievement is a “submitted”, “in review”, “accepted”, “in press” or “published” paper or abstract]
- Exit Review by Department Head [desired level of achievement is “satisfactory”]

3. Plans of assessment:

Student Learning Outcome	Data	Source	Collected
1 – To make satisfactory progress toward the degree, preparing for independent research to contribute new and fundamentally important knowledge to Biological Engineering	Cumulative GPA	Department	Annually
	Annual progress report	Major professors	Annually (June 30)
	Exit review	Department Head	At the time the student completes all the degree requirements
2 – To be prepared for independent research in Biological Engineering	Rubric to be filled out at student's candidacy exam (see attached)	<ul style="list-style-type: none"> <li>Major professors and thesis committee members</li> <li>Students</li> </ul>	At student's candidacy exam
	Exit review	Department Head	At the time the student completes all the degree requirements
3 – To be prepared to contribute new and fundamentally important knowledge to Biological Engineering	Rubric to be filled out at student's dissertation proposal evaluation (see attached)	<ul style="list-style-type: none"> <li>Major professors and thesis committee members</li> <li>Students</li> </ul>	At student's dissertation proposal evaluation
	Exit review	Department Head	At the time the student completes all the degree requirements
4 – To contribute new and fundamentally important knowledge to Biological Engineering or significantly modify, amplify, or interpret existing knowledge in a new and important manner	Rubrics to be filled out at student's final exam (see attached)	<ul style="list-style-type: none"> <li>Major professors and thesis committee members</li> <li>Students</li> </ul>	At student's final exam
	Exit review	Department Head	At the time the student completes all the degree requirements
5 – To be able to communicate effectively in a professional, scientific setting	Rubrics to be filled out at student's candidacy exam, proposal evaluation and final exam (see attached)	<ul style="list-style-type: none"> <li>Major professors and thesis committee members</li> <li>Students</li> </ul>	At student's candidacy exam, thesis defense and final exam
	Number of publications and conference presentations	Major professors	Annually (June 30)
	Exit review	Department Head	At the time the student completes all the degree requirements

**Summary: Data to be collected**

- Graduate student academic reviews and progress reports (annual)
- Cumulative GPA (annual)
- Rubric to be filled out at student's candidacy examination (see attached)
- Rubric to be filled out at student's dissertation proposal evaluation (see attached)
- Rubric to be filled out at student's final examination (see attached)
- Number of journal publications and conference presentations (annual)
- Exit review by Department Head at the time the students complete all of degree requirements

4. Reported annually to the Dean: Assessment results and analysis, and any consequential program or assessment process changes

## EVALUATION RUBRIC: CANDIDACY EXAMINATION

Student name: \_\_\_\_\_

Student ID: \_\_\_\_\_

Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

I/The student am/is prepared for independent research based upon:	Strongly agree = 1	Agree = 2	Neither agree nor disagree = 3	Disagree = 4	Strongly disagree = 5	N/A
(a) Comprehension of the relevant literature						
(b) Design and application of research methods and/or tools to solve research problem						
(c) Analysis and support for generalizations or generation of alternative solutions						
(d) Evaluation and validation						
(e) Effective oral communication skills						
(f) Effective written communication skills						
<b>Overall judgment</b>						
<b>Comments:</b>						

- This evaluation rubric serves as a model for a “tool” that can be used by the student’s advisory committee both as they prepare their students to meet program goals and SLO-2 and as they report on their success in required assessment reports. Details can be adjusted or fine-tuned by the Major Professors in consultation with advisory committee members to meet the nature of the student’s area of research. Desired level of achievement on the evaluation rubric is “agree or strongly agree, *i.e.*,  $\leq 2$ ”.
- **Instructions:**
  1. Major Professors and students should review and become familiar with the criteria in the evaluation tool, as a guide, prior to the preparation of a candidacy exam.
  2. The rubric should be scored both by the Major Professors in consultation with advisory committee members and by the students at the time the candidacy exam is completed.
  3. The feedback provided by the scored rubric should be discussed directly with the student.
  4. The completed rubric should be delivered to the Graduate Coordinator (or Department Head) for use as a valuable tool in graduate student learning outcomes assessment
  5. The student should keep the rubric page(s) as feedback for dissertation research development.

## EVALUATION RUBRIC: DISSERTATION PROPOSAL EVALUATION

Student name: \_\_\_\_\_

Student ID: \_\_\_\_\_

Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

I/The student am/is prepared for contributing new knowledge based upon:	Strongly agree = 1	Agree = 2	Neither agree nor disagree = 3	Disagree = 4	Strongly disagree = 5	N/A
(a) Comprehension of the relevant literature						
(b) Design and application of research methods and/or tools to solve research problem						
(c) Analysis and support for generalizations or generation of alternative solutions						
(d) Evaluation and validation						
(e) Effective oral communication skills						
(f) Effective written communication skills						
<b>Overall judgment</b>						
<b>Comments:</b>						

- This evaluation rubric serves as a model for a “tool” that can be used by the student’s advisory committee both as they prepare their students to meet program goals and SLO-3 and as they report on their success in required assessment reports. Details can be adjusted or fine-tuned by the Major Professors in consultation with advisory committee members to meet the nature of the student’s area of research. Desired level of achievement on the evaluation rubric is “agree or strongly agree, *i.e.*,  $\leq 2$ ”.
- **Instructions:**
  1. Major Professors and students should review and become familiar with the criteria in the evaluation tool, as a guide, prior to the preparation of a dissertation research proposal.
  2. The rubric should be scored both by the Major Professors in consultation with advisory committee members and by the students at the time the first complete draft of the proposal is submitted.
  3. The feedback provided by the scored rubric should be discussed directly with the student.
  4. The completed rubric should be delivered to the Graduate Coordinator (or Department Head) for use as a valuable tool in graduate student learning outcomes assessment.
  5. The student should keep the rubric page(s) as feedback for dissertation proposal development.

## EVALUATION RUBRIC: FINAL EXAMINATION

Student name: \_\_\_\_\_

Student ID: \_\_\_\_\_

Completed by: \_\_\_\_\_

Date: \_\_\_\_\_

I/The student contribute(s) new knowledge based upon:	Strongly agree = 1	Agree = 2	Neither agree nor disagree = 3	Disagree = 4	Strongly disagree = 5	N/A
(a) Comprehension of the relevant literature						
(b) Design and application of research methods and/or tools to solve research problem						
(c) Analysis and support for generalizations or generation of alternative solutions						
(d) Evaluation and validation						
(e) Effective oral communication skills						
(f) Effective written communication skills						
<b>Overall judgment</b>						
<b>Comments:</b>						

- This evaluation rubric serves as a model for a “tool” that can be used by the student’s advisory committee both as they prepare their students to meet program goals and SLO-4 and as they report on their success in required assessment reports. Details can be adjusted or fine-tuned by the Major Professors in consultation with advisory committee members to meet the nature of the student’s area of research. Desired level of achievement on the evaluation rubric is “agree or strongly agree, *i.e.*,  $\leq 2$ ”.
- **Instructions:**
  1. Major Professors and students should review and become familiar with the criteria in the evaluation tool, as a guide, prior to the preparation of a final exam (*i.e.*, final dissertation defense).
  2. The rubric should be scored both by the Major Professors in consultation with advisory committee members and by the students at the time the final exam is completed.
  3. The feedback provided by the scored rubric should be discussed directly with the student.
  4. The completed rubric should be delivered to the Graduate Coordinator (or Department Head) for use as a valuable tool in graduate student learning outcomes assessment
  5. The student should keep the rubric page(s) as feedback for dissertation development.