

Cleveland State University
Department of Electrical and Computer Engineering

Master of Electrical Engineering Program

Review of Assessment Annual Reports and Follow-up Actions

Academic Year 2003/2004 (August 2003 to May 2004)

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The 2003/2004 Assessment Annual Report for Program of Master of Electrical Engineering (MSEE) was submitted to each of the department faculty members on October 05, 2004 for review. It was discussed at the faculty meeting on October 16, 2004. The major findings, recommendations and actions that the faculty decided upon are as follows.

About the assessment and follow-up actions

Exit survey:

Assessment result based on exit survey generally shows more than satisfactory outcomes. The percentages of the number of the students who strongly agree with the outcomes are generally high. The average score is 1.71 and the standard deviation is 17%, where the scale 1 means "Strongly agree," scale 5 means "strongly disagree," and 6 means "No knowledge." The worst (highest) score is 2.00 for Part I.5 "The MSEE program awards teaching assistantships to the most qualified students."

Actions: The evaluation is good. No action is needed.

Thesis Defense survey:

Most of them were more than satisfactory in every question item but exemplary cases are 40~71% only. Considering the defense survey was completed by defense committee members, it is partly because of high standard of the faculty members. Exposure to related literature gets the worst score (exemplary cases are 40%) and two unsatisfactory cases were reported in quality of writing style.

Actions: Defense survey shows that more literature study is required when guiding students to write their dissertations and they need to pay more attention on their writing style. (Not discussed at the faculty meeting.)

About assessment instruments

Quantity of surveys:

Assessment result based on exit and defense survey generally shows more than satisfactory outcomes. However, the number of participants is so small that we cannot make a correct conclusion. We had 10 exit surveys while in fact 34 students had graduated from the

program last academic year (17 in each semester). With respect to the other instrument, thesis defense questionnaire, there was also some concern because we had 21 surveys.

Actions: A mechanism is recommended by which the students are required to complete exit questionnaires; for example, the department secretary would hold each student's application to graduate until the student had submitted this questionnaire. Regarding the thesis defense questionnaire, the recommendation was that, rather than filling them out in their offices after the defense, to do it in the room where the thesis defense happens.

Quality or appropriateness of survey questions:

There are some problems with the existing instruments themselves. For example, several questions on the survey could be ambiguously interpreted. More importantly, outcomes and the two survey questions do not map with each other. Either the objectives or the survey questions must be revised in a significant way. (The second issue was not discussed at the faculty meeting.)

Actions: It is recommended that the faculty review these instruments.

New assessment strategies:

Currently, two assessment strategies are used. New instruments must be introduced in order to better assess the MSEE program.

Actions: It is suggested that faculty course evaluation and project survey are included to assess more accurately. Employer survey and alumni survey are more difficult to use but can be included.

Cleveland State University
Department of Electrical and Computer Engineering

Master of Science in Electrical Engineering (MSEE) Program

Assessment, Assessment Report and Suggestions

Academic Year 2003/2004 (August 2003 to May 2004)

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I. On Assessment

Assessment is an ongoing process aimed at understanding and improving student learning. It involves making our expectations explicit and public; setting appropriate criteria and high standards for learning quality; systematically gathering, analyzing, and interpreting evidence to determine how well performance matches those expectations and standards; and using the resulting information to document, explain, and improve performance. When it is embedded effectively within larger institutional systems, assessment can help us focus our collective attention, examine our assumptions, and create a shared academic culture dedicated to assuring and improving the quality of higher education (Thomas A. Angelo, *AAHE Bulletin*, November 1995, p.7, http://www.aahe.org/assessment/assess_faq.htm).

The Provost made couple of comments regarding the program assessment in his university-wide broadcast messages. "We will continue to work on outcome assessment with a goal of achieving Level II by summer 2005. Major activities will focus on data collection and analysis in order to assess whether goals and objectives are met. If not, teaching and learning processes need to be refined. All of these have to be documented. We will also resume our internal program reviews and the University's strategic planning. These activities directly relate to the NCA accreditation. NCA's new criteria emphasize continuous quality improvement for our programs. Our education goals need to be related to the University's mission and goals and integrated with program outcome assessment, strategic planning, budgeting, and campus physical planning. In addition, there is an increasing expectation from governments and the public on accountability of colleges and universities. The message is clear that we need to do well in outcome assessment." (A Message from the Provost, August 18, 2003)

The Levels of Implementation from NCA are a tool (1) to assist institutions in understanding and strengthening their programs for assessment of student academic achievement and (2) to provide evaluation teams with some useful characteristics, or descriptors, of progress to inform their consultation and their recommendations related to those programs. The clusters of characteristics contained in Levels of Implementation emerge from rigorously applied research analysis of content found in team reports, the source of Consultant-Evaluators' discussion of assessment at scores of institutions. Characteristics of Level II implementation of assessment of student academic achievement are as follows. (Addendum to the Handbook of Accreditation, Second Edition, NCA)

1. Institutional culture

- a. Collective/Shared Values: A shared understanding of the purposes, advantages, and limitations of assessment exists and is broadening to include areas beyond the instructional division. ...
- b. Mission: Some but not all of the institution's assessment efforts are recognizably expressive of the sentiments about the importance of assessing and improving student learning found in the Mission and Purposes statements.

...

2. Shared responsibility

- a. Faculty: Faculty in many or most departments have developed measurable objectives for each of the program's educational goals. Faculty members are becoming knowledgeable about the assessment program, its structures, components, and timetable. ...
- b. Administration and Board: Unit heads devise strategies to ensure that their academic departments/programs implement the assessment plans they developed or develop them more fully. ...
- c. Students: There is student representation (undergraduate and graduate, as appropriate) on the assessment committees organized within the institution. ...

3. Institutional support

- a. Resources: Resources are made available to assessment committees seeking to develop skills in assessing student learning. ...
- b. Structures: Unit leaders (department heads) have responsibility for maintaining successful assessment programs as a part of their formal position descriptions.

...

4. Efficacy of assessment

- a. Efficacy: Assessment data are being collected and reported but not being used to improve student learning. ...

II. Goals, Objectives and Outcomes

Program Goals

The goals of MSEE are to provide students with an educational experience which helps them (i) lead fulfilling and productive lives, (ii) assume leading professional roles in industry, (iii) improve their employment and/or career possibilities as engineers upon graduation, (iv) continue their formal education in doctoral programs, and (v) participate in lifelong learning.

Program Objectives

The objectives of MSEE are to:

1. offer a MSEE curriculum that is a balance between theory and practice.
2. offer a MSEE curriculum that meets the current needs of industry
3. obtain teaching and research assistantships for qualified students
4. offer a MSEE curriculum that allows students to improve their employment possibilities after graduation
5. offer a MSEE curriculum that allows students entrance into doctoral programs after graduation
6. secure an adequate budget for the department
7. maintain an adequate level of student enrollment
8. promote faculty research
9. promote faculty teaching effectiveness
10. recruit and retain qualified faculty

Student Academic Achievement Objectives

The MSEE program at the Department of Electrical and Computer Engineering is designed for students to acquire:

1. a knowledge of advanced engineering analysis and design tools
2. the ability to use advanced engineering analysis and design tools to design practical systems
3. the ability to access and use the literature in one's field
4. the ability to communicate effectively

Outcomes of MSEE Program

The MSEE Program at the Department of Electrical and Computer Engineering is designed to produce graduates who have

- (a) an ability to apply knowledge of mathematics, science, and engineering to general electrical engineering and, in particular, to one or more of the

following areas: communications, computers, controls, power electronics, and power systems

- (b) an ability to design and conduct electrical engineering experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve electrical engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.

III. Student Academic Achievement Assessment Strategies

The following assessment strategies are used as appropriate.

1. Student exit questionnaire
2. Thesis defense questionnaire for thesis committee faculty
3. Project presentation questionnaire for project faculty
4. Exit exam
5. Employer survey
6. Alumni survey

In 2002, ECE Dept. used only two assessment strategies out of six: graduating student exit survey and the thesis defense questionnaire. (October 2, 2002)

This report also used the same two assessment strategies but it is necessary to use other strategies in the following years. For example, project presentation questionnaire can be easily employed by providing an appropriate form to faculty who teach graduate courses involving class projects. Employer survey and alumni survey are more difficult to use but can be included.

Assessment strategy #1: Student exit questionnaire

Graduating students are asked to fill out a questionnaire.

All academic achievement objectives are assessed.

Consists of three parts:

Part I:

1. The MSEE program promotes excellence in teaching.
2. The MSEE program promotes excellence in research.
3. The MSEE program provides best qualified faculty and promotes their development.
4. The MSEE program encourages faculty to obtain funds for research and to maintain state of the art laboratories.
5. The MSEE program awards teaching assistantships to the most qualified students.
6. The MSEE program awards research assistantships to the most qualified students.

Part II:

1. The MSEE students developed a deeper understanding of the principles underlying a particular field of study, as well as those underlying other fields.
2. The MSEE students developed a knowledge of the advanced methods of analysis and synthesis that are more powerful and more generally applicable than those taught at the undergraduate level.
3. The MSEE students developed the ability to independently read and understand the classical and contemporary works that contribute to advancements in the chosen field.
4. The MSEE students developed an insight into the significance and the limitations of the available results and methods, as well as the relationships of each other.
5. The MSEE students developed the capacity, imagination, and courage to contribute to the advancement of the electrical engineering field.
6. The MSEE students developed the ability to make quality written and oral presentations to technically literate audiences.

Part III:

Comments on what you feel strongly about the program.

Assessment strategy #2: Thesis Defense Questionnaire

Each member of the student's thesis committee will fill out a questionnaire immediately after the defense.

All academic achievement objectives are assessed.

1. Knowledge of advanced engineering analysis and design tools
2. The ability to use advanced engineering analysis and design tools to design practical systems

3. The ability to access and use the literature in one's field
4. The ability to communicate effectively
 - a. Quality of the writing style
 - b. Organization of the written dissertation
 - c. Organization of the presentation
 - d. Clarity of language usage
 - e. Quality of slides

IV. Assessment of Outcomes

Assessment result based on exit and defense survey generally shows more than satisfactory outcomes. However, the number of participants is so small that we cannot make definite conclusions. In the following years, a method needs to be employed to encourage participating in the surveys. Additionally, it is suggested that faculty course evaluation and project survey are included to assess the MSEE program more accurately.

Student exit questionnaire (Fall'03 – Spring'04, 10 students)

Outcomes/Criteria for evaluation	Score						Average
	1	2	3	4	5	6	
Part I							
1. The MSEE program promotes excellence in teaching.	2	6	1			1	1.89
2. The MSEE program promotes excellence in research.	4	4			1	1	1.89
3. The MSEE program provides best qualified faculty and promotes their development.	2	7		1			1.89
4. The MSEE program encourages faculty to obtain funds for research and to maintain state of the art laboratories.	4	3	1			2	1.63
5. The MSEE program awards teaching assistantships to the most qualified students.	3	3	1	1		2	2.00
6. The MSEE program awards research assistantships to the most qualified students.	3	5		1		1	1.89
Part II							
1. The MSEE students developed a deeper understanding of the principles underlying a particular field of study, as well as those underlying other fields	6	4					1.40
2. The MSEE students developed a knowledge of the advanced methods of analysis and synthesis that are more powerful and more generally applicable than those taught at the undergraduate level	5	5					1.50
3. The MSEE students developed the ability to independently read and understand the classical and contemporary works that contribute to advancements in the chosen field	4	6					1.60
4. The MSEE students developed an insight into the significance and the limitations of the available results and methods, as well as the relationships of each other	2	8					1.80
5. The MSEE students developed the capacity, imagination, and courage to contribute to the advancement of the electrical engineering field	5	5					1.50
6. The MSEE students developed the ability to make quality written and oral presentations to technically literate audiences	5	5					1.50
Part III							
"Choice of courses should be broadened." (2)							
"MSEE was very good making me a professional engineer." (2)							
"I feel embedded and digital lab courses are invaluable." (1)							

1: Strongly agree, 5: strongly disagree, 6: no knowledge

Average score is the average of scores 1~5.

The percentages of the number of the students who strongly agree with the outcomes are generally high. The average score is 1.71. The standard deviation is 17%. Most are around the average. The worst (highest) score is 2.00 for Part I.5 "The MSEE program awards teaching assistantships to the most qualified students." Compared to Part II questions, there is more diverse opinions including "no knowledge (score 6)" on Part I questions. It is also observed that students have some doubt on research funds and assistantships.

Thesis Defense Questionnaire (Fall'03 – Spring'04, 21 students)

Objectives/Criteria for evaluation	Exemplary	Satisfactory	Unsatisfactory	Average
1. Knowledge of advanced engineering analysis and design tools	9 (43%)	12	0	1.57
2. The ability to use advanced engineering analysis and design tools to design practical systems	14 (67%)	7	0	1.33
3. The ability to access and use the literature in one's field	8 (40%)	12	0	1.60
4. The ability to communicate effectively				
a. Quality of the writing style	10 (48%)	9	2	1.62
b. Organization of the written dissertation	15 (71%)	6	0	1.29
c. Organization of the presentation	13 (62%)	8	0	1.38
d. Clarity of language usage	13 (62%)	8	0	1.38
e. Quality of slides	14 (67%)	7	0	1.33

For calculating averages, Exemplary, Satisfactory and Unsatisfactory add 1, 2 and 3, respectively.

Most of the defense were more than satisfactory in every question item but exemplary cases are 40~71% only. Considering the defense survey was completed by defense committee members, it is partly because of high standard of the faculty members. Exposure to related literature gets the worst score but two unsatisfactory cases were reported in quality of writing style.

Recommended Follow-up actions on MSEE

1. Based on exit survey, it was noted that the MSEE program needs to encourage faculty to obtain funds for research and to maintain excellence in teaching and research. Also, more opportunities of teaching and research assistantships are desirable.
2. Defense survey shows that more literature study is required when guiding students to write their dissertations and they need to pay more attention on their writing style.

Recommended Follow-up actions on assessment strategies

1. Assessment result based on exit and defense survey generally shows more than satisfactory outcomes. However, the number of participants is so small that we cannot make a correct conclusion. In the following years, a method needs to be employed to encourage participating in the surveys.
2. Additionally, it is suggested that faculty course evaluation and project survey are included to assess the MSEE program more accurately. Employer survey and alumni survey are more difficult to use but can be included.