PROGRAM ASSESSMENT
ASSESSMENT ACTIVITIES

Degree Program: M.S. Mechanical Engineering
Location: Engineering 310

Program Coordinator:
MAE Associate Chair: N. Okamoto
MAE Assessment Coord.: R. Yee
CoE Grad. Studies Rep.: W. Du
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MAE Grad. Studies Chair: J. Lee
MAE Interim Dept. Chair: D. Desautel

Term: 2010-2011

PROGRAM EDUCATIONAL OBJECTIVES

1. A strong foundation beyond the undergraduate level in their chosen focus area as well as in mathematics, basic science and engineering fundamentals, to successfully compete for technical engineering positions in the local, national and global engineering market, advance in their current position or pursue doctoral studies.

2. Contemporary professional and lifelong learning skills to be able to apply theory to solve practical engineering problems.

3. The expertise necessary to perform design and/or analysis of mechanical engineering systems with possible specialization in areas such as: energy systems, electronics cooling, electronics packaging & reliability, finite element analysis, computer-aided design, mechatronics, microelectromechanical systems, product design, robotics, automation & manufacturing.

4. Strong verbal and written communication skills, including the ability to read, write, and comprehend technical documents.

5. Ability to think and work independently to perform design and in-depth analysis in solving open-ended mechanical engineering problems.

PLAN

1. Every MSME project and thesis report is evaluated by three faculty members (the primary advisor and two additional project committee members) using the evaluation criteria shown in the table below. Satisfying the criteria is synonymous with meeting program outcomes (“Program Outcomes” are not defined separately from these criteria). Each criterion is scored on a 1-5 scale.

2. The results are collected and discussed on two-year cycle as shown in the schedule above. The ME faculty members on the MAE Graduate Studies Committee, with input from AE faculty members on that committee, draw conclusions regarding the strengths and weaknesses of the MSME Program.

3. Depending on the nature of weaknesses identified, curricular changes are taken into consideration by the MAE Graduate Studies Committee. Recommended changes to other courses in the MSME curriculum are recommended to the Course Coordinators of those respective courses.
SCHEDULE OF ASSESSMENT ACTIVITIES

Please complete the schedule of assessment activities below by listing all Program Outcomes (POs) by number down the left column and indicating when data were/will be collected (C) and when they were/will be discussed (D) by your faculty. You can also schedule/track program changes resulting from your assessment activities by indicating an “I” (implemented changes) where relevant. This schedule is meant to be fluid; providing a proposed schedule for future assessment while at the same time, providing a record of your efforts as the program planning cycle progresses.

<table>
<thead>
<tr>
<th>POs</th>
<th>S11</th>
<th>F11</th>
<th>S12</th>
<th>F12</th>
<th>S13</th>
<th>F13</th>
<th>S14</th>
<th>F14</th>
<th>S15</th>
<th>F15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-9</td>
<td>C</td>
<td>C</td>
<td>C, D</td>
<td>C, I</td>
<td>C</td>
<td>C</td>
<td>C, D</td>
<td>C, I</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>

Note: The Fall Assessment report includes the summer courses.

EVALUATION CRITERIA

<table>
<thead>
<tr>
<th>Criterion</th>
<th>PEO1 Technical Foundation</th>
<th>PEO2 Lifelong Learning</th>
<th>PEO3 Specialized Expertise</th>
<th>PEO4 Comm. Skills</th>
<th>PEO5 Independent Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Motivation for the work was convincing and clear objectives were defined.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 A thorough literature search was performed with proper citations, and an understanding of the cited literature was clearly evident.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>3 A methodical, in-depth analysis and/or design of a mechanical engineering system was performed, using appropriate assumptions as needed.</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>4 Mathematical representations and computations were applied appropriately for graduate level work.</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5 Science and engineering fundamentals were applied appropriately for graduate level work.</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6 Modern tools (computational or experimental) were used effectively as needed.</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>7 Results of the work were presented effectively, using graphs and tables appropriately as needed.</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8 The report was well written, with correct language and terminology used throughout.</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>9 Key points of the work were summarized effectively and meaningful conclusions were drawn.</td>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Scale: 1 = Lacking, 2 = Weak, 3 = Acceptable, 4 = Good, 5 = Excellent
Program Outcome #1

- Program Outcome #1 is to demonstrate success in meeting this specific criterion:

  “Motivation for the work was convincing and clear objectives were defined.”

  This outcome may thus be interpreted in extended form as: “An ability to express motivation for an engineering project convincingly and to define its objectives clearly.”

NOTE: This abbreviated evaluation of Program Outcome #1 is an example of just one of the 9 criteria used for assessment. It is abbreviated because the outcomes will be fully evaluated as a set every 2 years according to the schedule of assessment activities presented above.

1.1 Data Collection:

[SPRING 2011] – For this assessment cycle, how were the data collected and what were the results?

The data were collected according to the assessment plan of evaluating MSME projects and thesis reports that were completed this semester. An evaluation form listing the 9 criteria in the table above was solicited from each student’s MS project committee. For this criterion assessed, the average score from 30 evaluations was 4.3 out of 5.0. The average across all 9 criteria was 4.0.

1.2 What have you learned about this Student Learning Outcome?

[SPRING 2011] – Based on the results in part I, briefly summarize the discussion surrounding this outcome, i.e., what does the faculty conclude about student learning for this SLO?

A score of “4.0” corresponded to subjective assessment of “good” performance in meeting the criterion. The average of 4.3 suggests that this criterion is being satisfied.

1.3 Action Items(s) (if necessary):

[SPRING 2011] – Based on the discussion in part II, what actions will the department take to improve student learning, e.g., program changes, changes in pedagogy, process changes, resources requests, etc?

This semester is falls in a “collection” step of the assessment schedule. This data is collected as summarized for promoting continuity. However, no formal changes are enacted at this time. Implemented changes will occur following the more comprehensive assessment on the 2-year cycle.

1.4 Results of Action Items

[SPRING 2011] – What does assessment of student learning show after implementation of any action items? What, if anything, is planned next?

(Not applicable.)