Nuclear Engineering Student Learning Outcome Assessment Report

1. Program Mission

The Nuclear Engineering Program at Missouri S&T has as its primary mission to provide an outstanding and comprehensive undergraduate and graduate education to tomorrow’s leaders in nuclear engineering. The program provides well-educated nuclear engineering professionals and leaders to Missouri and the nation in the commercial nuclear industry, national laboratories, hospitals, graduate schools, and the nation’s defense and federal agencies.

The program educational outcomes are:

1. Graduates will continue to demonstrate a sound knowledge of nuclear engineering and related technologies as members of their professional community through involvement in research projects, development projects, computer modeling, engineering analysis, nuclear instrument measurements, and similar endeavors.

2. Graduates will continue to use logical, creative, collaborative, analytical, and problem solving abilities to address emerging multidisciplinary endeavors; demonstrable through scholarly articles and/or professional reports.

3. Graduates will continue to demonstrate technical communication and interpersonal skills, enabling them to excel in their profession.

4. Graduates will continue to demonstrate leadership with an understanding of, and a commitment to, professional ethics.

5. Graduates will continue to demonstrate the capability to conduct research, enabling them to contribute to meeting the needs of their profession; demonstrable through scholarly publications, research project reports, patents, and other R&D related accomplishments.

   Graduates will continue to demonstrate a recognition of, and a desire for, the pursuit of life-long learning that will foster their ability to adapt to change; demonstrable through professional license(s), professional certificate(s), continuing education credits, post-graduate degree(s), R&D projects, or similar endeavors.

2. Graduate Learning Outcomes (GLO)

   a. Campus-Wide Student Learning Outcomes:
      Programs must demonstrate that their graduates have:

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I. Knowledge: An ability to apply knowledge of subject matter within their field of study

II. Communication: An ability to communicate effectively within their field of study.

III. Critical Thinking: An ability to engage in productive critical thinking within their field of study

IV. Professional Development: An ability to develop professional within their field of study.

3. Mapping of Program’s Student Outcomes to Campus Student Learning Outcomes

Not applicable. Nuclear Engineering program adopted the campus-wide student learning outcomes.

4. Methods/Instruments and Administration

Nuclear Engineering uses direct assessment of thesis (MS program) and dissertation (PhD program) for graduate degrees. This is in addition for formal course work grade point-based grading scheme.

5. Findings

The table below shows the average score in each assessment criterion in the last 2 academic years. The scores were provided by the MS/PhD advisory committees of the students involved. The 2015/16 session averages cover 5 PhD dissertation and 4 MS thesis defenses. The students were ranked as proficient (>4.0 score) but below exception (5.0 Score) in all student outcome assessment categories. The 2016/17 averages cover 3 PhD dissertation defenses, 6 comprehensive exams, and 6 MS thesis defenses. The 3 students involved in the PhD defenses were also part of the comprehensive exam records. The averages indicate that the students were better than acceptable (>3.0) but less than proficient in all assessment categories. These represent a drop in performances from the previous year.

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Knowledge</th>
<th>Communication</th>
<th>Critical Thinking</th>
<th>Professional Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015/16 *</td>
<td>4.33</td>
<td>4.08</td>
<td>4.06</td>
<td>4.31</td>
</tr>
<tr>
<td>2016/17 **</td>
<td>3.74</td>
<td>3.62</td>
<td>3.70</td>
<td>3.89</td>
</tr>
</tbody>
</table>

* Average over 9 instances of MS Thesis and PhD Dissertation defenses involving 9 students.
** Average over 16 instances of MS Thesis/Dissertation/Comprehensive exams involving 13 students

6. Continuous Improvement Changes

Based on the finding, the program will work to improve the student outcomes for our graduate students. This will be achieved by improving the mentoring of graduate students particularly by their respective advisors. In addition, further exposure of the students through conferences and seminars would improve their knowledge, communication and professional development.