Mining and Nuclear Engineering Department  
(Explosives Engineering Program)  
Student Learning Outcome Assessment Report

1. Department/Program Mission

The Explosives Engineering Program at Missouri S&T is unique and provides education and training in Explosives Engineering to graduate students for government and the mining, construction and defense industries in Missouri and the USA. The program provides students with education and research capabilities to make a difference in explosives industries of all kinds, and graduates will be able to go into management and scientific positions in these industries with the knowledge and background to be successful.

Our program educational outcomes include the following specific skills:

- Understanding and application of the functioning of explosives and initiation systems.
- Understanding and application of explosion effects.
- Understanding and application of safety as applied to explosives in field use, testing and demonstration environments.
- Experience with the safe handling of energetic materials.
- Understanding of the application of explosives for fragmenting rock and other materials.
- Expertise in focused professional areas such as demolition, blast resistance, rock breakage or weapons systems design, loading and production.
- Understanding of the challenges of using explosives and their environmental impact.

2. Graduate Learning Outcomes (GLO)

a. Campus-Wide Student Learning Outcomes:

Programs must demonstrate that their graduates have:

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.

4. Methods/Instruments and Administration
The Explosives Engineering program uses direct assessments of thesis/dissertation student performance on major exams.

5. Findings
The table below shows the average scores of assessments by the Ph.D. advisory committees of 2 students during the 2016/2017 academic year. This data covers assessments administered at 2 comprehensive examinations. Based on these results, on average the advisory committees rank the Explosives Engineering students as proficient in their knowledge, communication and critical thinking skills, as well as their professional development.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Knowledge</th>
<th>Communication</th>
<th>Critical Thinking</th>
<th>Professional Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average score</td>
<td>4.11</td>
<td>4.11</td>
<td>4.00</td>
<td>4.00</td>
</tr>
</tbody>
</table>

6. Continuous Improvement Changes
Whilst these results are encouraging, since this is a relatively new program the sample size is very small and the results may not be representative. We will continue to work to improve student performance on all of the graduate learning outcomes.