Summary:

- Fall 2004 Enrollment 20.3 students/FTE (2nd highest of any Engineering program)
- Conferral 18% of all B.S. Engineering degrees with 9% of Engineering Faculty
- 5th Consecutive Year of 100%+ FTE/Budget Ratio: 5 Year Avg. = 146%
- Program’s Science Citation Index Publication Rate: Highest on Campus
- 517 k$ in annualized research grant expenditures (or 150 k$/FTE)
- Chemical Engineering Senior one of eight finalists in National AIChE Undergraduate Research Paper Contest
- Assessment: Survived ABET – EAC 2000 Accreditation
- Assessment: Published 2nd Annual Educational Objectives Report (Attached)
Chemical Engineering Program Mission:

The mission of our program is to engage and prepare students for professional careers which require command of the principles of Chemical Engineering. We will focus on the development of complete engineers who can foster innovation through know-how and champion ideas through effective communication. We will deliver a thorough education with insightful teaching, an innovative curriculum, research opportunities, summer job experiences, and channels for permanent, successful careers. All of our efforts are done in the context of providing the human and technical resources critical to enhancing the vitality of the State of New Mexico and the people and businesses that thrive within this region. Like our counterparts in industry, we recognize that achievement of our mission can only be accomplished by continual self-assessment and actions to improve.

Program and Educational Objectives

Program Objectives:

1. We will foster insightful classroom and laboratory experiences enhanced by the presence of students with solid educational backgrounds, lead by strong teaching from engaging faculty.

2. We will together with our students, administration, industrial supporters, and other constituents (as both individuals and as a team), foster an environment of continual self-assessment and improvement.

Educational Objectives:

1. We will develop complete engineers who can: solve problems, experiment, innovate, be resourceful, and champion ideas through effective communication.

2. We will engender an understanding of the broad reach of a modern Chemical Engineering education and the array of knowledge required to implement solutions which will benefit our society.

3. We will provide a conduit to successful careers in the spectrum of fields which benefit from a command of the principles of Chemical Engineering.

4. We will foster a life long love of learning, opening doors to graduate study and enabling graduates to adapt to changes and opportunities in the profession.
## Report Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Actions and Ownership for 2005</td>
<td>4</td>
</tr>
<tr>
<td>Programmatic Goals and Objectives</td>
<td>4</td>
</tr>
<tr>
<td>Educational Objectives – Learning Outcomes</td>
<td>4</td>
</tr>
<tr>
<td>Teaching Effectiveness and Loads</td>
<td>5</td>
</tr>
<tr>
<td>Research Productivity</td>
<td>6</td>
</tr>
<tr>
<td>Enrollment</td>
<td>8</td>
</tr>
</tbody>
</table>

### Appendix:

- Assessment Report – 2004 Educational Objective Report (attached)
Recommended Actions and Ownership for 2005:

Programmatic Goals

1. Carry Over: Carry out plan to increase “bodies” involved with Chemical Engineering students (FTE = 4.0) Owner Weinkauf/Gerity

2. Carry Over: Initiate “Real” Space and Utilization Dialogue with all Dept’s in building - Owner: Strategic Planning Committee (Weinkauf) / President

3. Carry Over: Reinvigorate Freshmen Recruiting Plan - Goal of 20 New ChE Fall 2005 - Owner: Jeon/Dong

4. Continue to Develop Graduate Component of Work - Goal 90 Credit Hrs/Yr by Fall 2006 - Owner: ChE Faculty

5. Continue to Assess Program and Assessment Plan: Owner: Advisory Board/ChE Faculty


7. Develop 5 Year Plan. Owner: ChE Faculty Due January 2005.

8. Maintain research expenditure and publication momentum (ChE Faculty).

Educational Objectives: (Learning Outcomes)

1. Adjust the curriculum to reinforce students exposure to Numerical Methods in the Junior and Senior years. (Owner: Jeon)

2. Incorporate Design of Experiments into the Unit Operations Laboratory. (Owner: Dong)

3. Learn from other schools effective methods of teaching assessment and modes to improve teaching effectiveness (Owner: Weinkauf)

4. Provide a more complete examination of the low FE exam scores in Process Equipment Design and suggest course of action (Owner: Bretz)

5. Conduct the scheduled 5-10 year review of alumni and gage success of Educational Objective #4 (Owner: Weinkauf).
Teaching Effectiveness and Loads

From a review of the individual teaching evaluations for each instructor in the program, the average overall teaching score decreased from last year. One faculty member (Weinkauf) average overall quality of instruction score increased, while the others showed a margin decrease in ratings. As shown below, the average teaching score for 2004 is 3.97. During this period, the number of student credit hours taught in both the graduate and undergraduate levels increased significantly.

<table>
<thead>
<tr>
<th>Name</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dong</td>
<td>4.29</td>
<td>4.31</td>
<td>4.08</td>
</tr>
<tr>
<td>Jeon</td>
<td>3.58</td>
<td>3.85</td>
<td>3.42</td>
</tr>
<tr>
<td>Weinkauf</td>
<td>4.10</td>
<td>4.30</td>
<td>4.42</td>
</tr>
<tr>
<td>Average</td>
<td>3.99</td>
<td>4.15</td>
<td>3.97</td>
</tr>
<tr>
<td>Total</td>
<td>794</td>
<td>867</td>
<td>919</td>
</tr>
<tr>
<td>Undergrad</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Credit Hrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Graduate</td>
<td>46</td>
<td>71</td>
<td>78</td>
</tr>
<tr>
<td>Student Credit Hrs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The teaching and graduate advising loads of the program continue to show positive formula funding for the past five years.

![Figure 1. FTE formula funding from teaching load normalized to the program budget.](image-url)
Research Productivity

Despite the purely undergraduate nature of the Chemical Engineering Department, we continue one of the highest levels of research activity per FTE on campus. In 2004, our 3.5 FTE produced 15 published papers and patents. This represents an increase of 33% over the previous year. According to the Materials Engineering SCI statistics (See Figure 1, the Chemical Engineering program over the past three years has the highest SCI publication rate on campus (1.62 publications/FTE).

![Figure 2. 3 year running average of Science Citation Index publications per FTE. (2003 darker shade, 2004 data lighter shade) Note: Chemical Engineering publishes at the highest rate at New Mexico Tech.](image)

![Figure 3. Chemical Engineering research expenditures per FTE.](image)
The five year goal (Fall 2005) is to bring the graduate population to 9 (that is grad. Students advised by Chemical Engineering faculty). At present, 8 graduate students and three (3) post docs are advised by ChE faculty, representing an increase of 1 grad student over the previous year. One tracking measurement of our ability to attain the 9 grad student goal is the annualized grant dollars received for any particular year. Annualized grants received by the 3 Chemical Engineering research faculty (Dong, Jeon, and Weinkauf) increased from 241k$ in 2003 to 516k$ in 2004. The total represents over 150 k$/FTE (See Figure 3). To improve this mark, Dr. Jeon will be continue to mentored regarding grantsmanship. The expected mark for 2005 will be approximately 740 k$ or 211 k$/FTE.
Enrollment:

2005 Five Year Plan: The Chemical Engineering Program will maintain enrollment in the range of 16 – 20 undergraduates per FTE of faculty resources committed to the program. As shown in Figures 4 and 5, Chemical Engineering maintains a robust enrollment meeting or exceeding our stated goals.

Figure 4. **Current and Expected Undergraduate Chemical Engineering Enrollment as well as number of entering Freshmen each fall.**

Figure 5. **Undergraduate Engineering Enrollment per FTE (Fall 2004)**