2005 Department Activity Report

Chemical Engineering

Prepared Spring 2006

by

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Chemical Engineering Chair

Summary:

• Fall 2005 Enrollment 22.6 students/FTE (3rd highest on campus)
• Conferred 21% of all B.S. Engineering degrees with 10% of Engineering Faculty and 7% of the space resources allotted to Engineering programs.
• 6th Consecutive Year of 100%+ FTE/Budget Ratio: 5 Year Avg. = 146%
• Highest on Publication Rate on Campus: Science Citation Index
• 745 k$ in annualized research expenditures (or 210 k$/FTE) - 44% increase over 2004.
• Assessment: Survived ABET – EAC 2000 with 6 year Accreditation
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.

Educational Objectives

The following objectives have been established by the program faculty in conjunction with our students and advisors from industry. They describe the characteristics and expected accomplishments of our future alumni.

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

2. Our graduates will possess 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. Our graduates will be engaged in successful careers covering the spectrum of fields which require a command of the principles of Chemical Engineering.

4. Our graduates will benefit from a lifelong love of learning, opening doors to graduate study and enabling graduates to adapt to changes and opportunities in the profession.
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Assessment Report Submitted Under Separate Cover
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/VPAA – GOAL NOT MET

2. Carry Over: Initiate “Real” Space and Utilization Dialogue with all Dept’s in building - Owner: Weinkauf / VPAA – GOAL NOT MET


4. Continue to Develop Graduate Component of Work - Goal 90 Credit Hrs/Yr by Fall 2006 - Owner: ChE Faculty - GOAL MET w/ 114 graduate credit hours assigned to ChE Faculty

5. Continue to Assess Program and Assessment Plan: Owner: Advisory Board/ChE Faculty - GOAL MET w/ ABET Accreditation


7. Develop 5 Year Plan. Owner: ChE Faculty Due January 2005. – GOAL NOT MET.

8. Maintain research expenditure and publication momentum (ChE Faculty). GOAL MET w/ highest publication rate on campus and
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 members (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>
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<tr>
<td>Dong</td>
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<td>4.31</td>
<td>4.08</td>
<td>4.09</td>
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<tr>
<td>Jeon</td>
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<td>3.85</td>
<td>3.42</td>
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<tr>
<td>Weinkauf</td>
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<td>4.30</td>
<td>4.42</td>
<td>4.45</td>
</tr>
<tr>
<td>Average</td>
<td>3.99</td>
<td>4.15</td>
<td>3.97</td>
<td>4.10</td>
</tr>
</tbody>
</table>

Total Undergrad Student Credit Hrs: 794, 867, 919, 930
Total Graduate Student Credit Hrs: 46, 71, 78, 114

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.
Research Productivity

Publications: 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 2005, our 3.5 FTE produced 10 science citation indexed journal articles. According to the Materials Engineering SCI statistics (See Figure 2), the Chemical Engineering program has the highest 3-year running average SCI publication rate on campus (2.1 publications/FTE).

While Chemical Engineering has consistently had high average publications per faculty, this marks that 2nd year in a row that Chemical Engineering has achieved the highest publication rate on campus.

Figure 2. 3 year running average of Science Citation Index publications per FTE. (2003 light blue, 2004 white, 2005 dark grey) Note: Chemical Engineering publishes at the highest rate at New Mexico Tech.
Number of Graduate Students: The departmental goal is to maintain a graduate population to 9 (that is grad. Students advised by Chemical Engineering faculty). This amounts to 3 graduate students per research faculty member. At present, 8 graduate students and five (5) post docs are advised by ChE faculty. This balance meets our departmental goals. As an additional measure of this effort, we have achieved our departmental goal of 90 graduate student credit hours with total of 114.

Research Funding: One tracking measurement of our ability to attain the desired level of graduate student involvement 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 516k$ in 2004 to 745k$ in 2005. The total represents over 210 k$/FTE (See Figure 3). To improve this mark, Dr. Jeon will be continue to mentored regarding grantsmanship. The expected mark for 2006 will be a similar level.
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.](image1)

![Figure 5. Undergraduate Engineering Enrollment per FTE (Fall 2005)](image2)
Recommended Actions for 2006:

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: Weinkauf / Administration


4. Understand the career goals and ensure satisfaction of our faculty: Owner: Weinkauf / VP Romero.

5. Reach out to elder alumni to become involved in the development and direction of the program. Owner: Weinkauf

6. Bring all faculty in line with expectations for excellence. Owner: Chair