

University of New Mexico
Department of Nuclear Engineering
Academic Program Review

Review Panel Report

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Table of Contents

Introduction to the Report	3
Summary of Findings	3
Students Learning Goals and Outcomes.....	4
Teaching and Learning Curriculum	5
Teaching and Learning Continuous Improvement	5
Students.....	6
Faculty	6
Resources and Planning.....	7
Facilities	8
Peer Comparisons	8

Introduction to the Report

This report is prepared based on the review of the Fall 2018 departmental self-study report and the results of site visit by the review panel, Professors Mark Gilmore (internal reviewer) Todd Palmer and Tunc Aldemir (external reviewers). This report follows the format provided by the Office of the Academic Affairs, and is consistent with the outbrief presentation delivered at the conclusion of the site visit on October 3, 2018. According to the instructions provided by the Office of Academic Affairs, this report should catalog the strengths and weaknesses of the nuclear engineering (NE) department (NED) at the University of New Mexico (UNM) without providing suggestions for remedies and or improvements. The contents of the report are organized according to the following sections:

- Summary of Findings
- Students Learning Goals and Outcomes
- Teaching and Learning Curriculum
- Teaching and Learning Continuous Improvement
- Students
- Faculty
- Resources and Planning
- Facilities
- Peer Comparisons

Summary of Findings

The overall findings are summarized below:

Strengths:

- The program leverages geographical and technical proximity to Sandia National Laboratory and Los Alamos National Laboratory.
- There is recent growth in undergraduate and graduate student populations.
- Recent faculty and instructor hires have demonstrated success.
- Facilities (office, instructional and research space) are new and top notch
- Support for continued growth of the program from the School of Engineering (SOE)

Shortcomings:

- The graduate program learning goals and outcomes are not as well-publicized, and available to students, as the those of the undergraduate program.
- Other than the SOE efforts, NED as a unit does not engage in significant undergraduate recruiting activities.

- There is a significant risk of overburdening the NED's recently hired Lecturer with non-teaching responsibilities.
- NED engages in strategic planning activities but the process and outcomes are not well-described in the self-study.

Student Learning Goals and Outcomes

Overall Findings: Met (M)

Strengths: In 2014, NED separated from the Department of Chemical Engineering to become its own department, increasing its stature within the U.S. academic community and its ability to recruit high-quality faculty and students. The significance and value of the NED, because of its proximity to two major U.S. national nuclear laboratories and other state industry, is well-recognized by the SOE and the university. It is clear that the NED educational and research mission and outcomes serves the state, its industries, national laboratories, the nation and the world.

The learning goals of the NED undergraduate program are clearly mapped into University's mission statement, are well-defined and are well-publicized. The assessment process for the student learning outcomes are in line with the ABET accreditation process. NED has had several cycles of successful accreditation. In addition to the feedback from students and faculty members, NED receives valuable input from alumni and industrial board members. NED also engages in strategic planning activities during faculty meetings and annual faculty retreats with periodic input from their industrial advisory board. This continuous improvement loop has led to changes in academic offerings and departmental structure, with specific examples including the impact of their most recent ABET accreditation and the 2009 APR.

Shortcomings: The graduate program learning goals and outcomes are not as well-publicized as the those of the undergraduate program. They are not readily available from the NED website, nor is there a graduate handbook available for download that contains this information for graduate students.

Teaching and Learning Curriculum

Overall Findings: Met (M)

Strengths: While the 124 credit hours (CH) required to obtain the BS degree in Nuclear Engineering is greater than the university minimum of 120 CH, the self-study provides a thoughtful justification for the additional 4 CH based on the multidisciplinary nature of the nuclear engineering discipline. NED has several important curricular collaborations with other units at UNM including Medical Physics, Civil Engineering and Chemical and Biological Engineering. NED has a healthy and well-documented distance (video/online) delivery of curriculum and utilizes a learning management system. The hiring of a person dedicated to the advising of both undergraduate and graduate students has addressed an ABET-identified deficiency, and is clearly impacting the quality of the student experience and progression through the curriculum.

Shortcomings: None identified.

Teaching and Learning Continuous Improvement

Overall Findings: Met (M)

Strengths: NED has been successful in assuring undergraduate student progression with quality educational outcomes as assessed by external ABET evaluation. The ABET evaluation process relies heavily on a continuous improvement model. The continuous improvement process used to assess Masters and PhD degree programs are thorough, address relevant skills and competencies, and are consistent with processes used throughout the SOE at UNM and at other universities. Assessment data are acquired in a manner similar to the assessment questionnaires for ABET. Changes are being made to the curriculum, primarily in the undergraduate program, and the impact of these changes is being measured. There is also evidence provided (in the self-study and in personal interactions at the site visit) that indicates that improvements are being made in the assessment processes themselves.

Shortcomings: None identified.

Students

Overall Findings: Met (M)

Strengths: Undergraduate enrollment is quite healthy with approximately 90 students in the NE major over the past two academic years. These numbers are impacted by changing the responsibility of the advising of pre-majors from the SOE to individual departments. Enrollments are healthy in comparison with peer institutions. In particular the graduate enrollments have increased with coordinated efforts through the SOE. The admission criteria and requirements for admission to the programs are provided on the departmental website. The self-study contains a well-documented analysis of enrollment, persistence/retention and graduation trends. Becoming a stand-alone department is making and will continue to make a significant impact on student numbers, both in the undergraduate and graduate programs. The hiring of an Academic Advisor last year has been very impactful on student support, and helped the SOE to make school-wide changes to address previously communicated ABET evaluation concerns.

NED communicated plans to recruit high school students from SE New Mexico (with assistance from ESS) and to engage in broader recruiting efforts in the Western U.S. There is recognition that, though student enrollment trends are positive without significant recruiting efforts, modest recruiting could be beneficial.

Shortcomings: Other than the SOE efforts, NED as a unit does not engage in significant efforts to recruit undergraduate students. The self-study doesn't mention ongoing, and valued, NE-specific tutoring activities. These activities occur and were mentioned specifically by students at the site visit. The undergraduate advising process involves an academic (non-faculty) advisor and a faculty advisor. Students perceive that faculty advisor assignments cannot be changed based their preferences.

Faculty

Overall Findings: Met (M)

Strengths: NED is staffed by a well-qualified and accessible faculty providing high-quality research and teaching experience for students. The self-study describes the algorithm

used by NED leadership for the determination of teaching loads and it is sensible. Professional development activities for faculty include mentoring, access to services provided by the Center for Teaching and Learning and other faculty-specific opportunities, as detailed in meetings with faculty during the on-site visit. Faculty are winning competitively-awarded grants, writing peer-reviewed papers, presenting at prestigious conferences and filing patents. Junior faculty hires have been a particular bright spot in the past few years, creating a high-energy environment and increasing optimism about the future of the discipline and the NED. Faculty directly advise both undergraduate and graduate students, and the students recognize the value of this activity. NED has developed a realistic projection of future hiring, given budget realities for higher education in the state.

Shortcomings: There is a significant risk of overburdening NED's recently hired Lecturer with non-teaching responsibilities. One of the very successful recent junior faculty hires is leaving for a faculty position at an international university, which impacts ongoing research projects and graduate student support.

Resources and Planning

Overall Findings: Met (M)

Strengths: The self-study clearly describes the NED's fiscal situation and while the I&G budget doesn't cover all the salaries, NED functions very well. The NED faculty are quite research active, which provides additional funding to amplify the I&G investment. Sharing staff with the Department of Chemical and Biological Engineering creates efficiencies without sacrificing service to the either unit. Library resources are sufficient to meet the needs of students and faculty.

Shortcomings: Strategic planning activities occur in faculty retreats, during faculty meetings and during Industrial Advisory Board meetings, but the process and outcomes are not well-described in the self-study.

Facilities

Overall Findings: Met (M)

Strengths: The newly remodeled Farris building provides excellent new office, classroom, teaching laboratory, and research space. Research space in the Centennial and Mechanical Engineering buildings is also of very high quality and being utilized. Students have access to a top-notch lounge area, a study room and a computer laboratory. Meeting space is of high-quality and is readily available to the Department.

Shortcomings: If there is modest of significant grown in the faculty or student populations, additional space may be difficult to find. Some of the laboratory space in the Farris Engineering Center may require additional funds to develop it to a state where it can be used.

Peer Comparisons

Strengths: The self-study contains a thorough and accurate examination of similarities/differences in comparison with a thoughtful group of peer institutions. NED is aware of the importance of increasing awareness of its current status and has committed to do so. Ideas discussed include hosting conferences (such as the American Nuclear Society Student Conference) and creating a lecture series to invite influential members of academia to come to campus and meet faculty and become more familiar with the environment and ongoing activities.

Shortcomings: N/A