



Mechanical Engineering Program Review 2018-19

Closing MOU

Date: August 28, 2019

Overview

Degree/Certificate Programs Reviewed: Bachelor of Science in Mechanical Engineering
Master of Science in Mechanical Engineering
Ph.D. in Mechanical Engineering

Department Chair & Dean: Miles Greiner, Chair; Manos Maragakis, Dean

External Reviewers & Affiliation: Undergraduate:
Dr. Brian J. Swenty, College of Engineering and Computer Science, University of Evansville, Accreditation Board for Engineering and Technology (ABET) Chair
Dr. Mark Osborn Federle, Academic Affairs, Marquette University, Accreditation Board for Engineering and Technology (ABET) Chair
Dr. Jean Ragan Stephenson Blair, United States Military Academy, Accreditation Board for Engineering and Technology (ABET) Chair
Dr. Sriram Somasundaram, Pacific Northwest National Laboratory, Accreditation Board for Engineering and Technology (ABET)
Graduate:
Dr. Yoav Peles, Department of Mechanical & Aerospace, University of Central Florida
Dr. Hanchen Huang, College of Engineering, University of North Texas

Date of External Visit: September 17-19, 2017 and March 25-26, 2019

Review Process Summary

The Mechanical Engineering program was scheduled for regular program review as mandated by the Board of Regents and University policy. A self-study document for the department and its programs was developed by the department faculty and completed in the Summer 2017 for undergraduate programs and in Spring, 2019 for graduate programs. These respective reports were provided to the undergraduate reviewers from the Accreditation Board for Engineering and Technology (ABET) before they conducted an on-campus visit on September 17-19, 2017 and provided to two graduate reviewers before they conducted an on-campus visit on March 25-26, 2019. The external reviewers reviewed the program and met with relevant faculty, staff, students and administrators to determine the department's accomplishments, examine strengths and weaknesses, and identify opportunities as it plans for the future. A final report was issued by the site visitors shortly after the review visit. In accordance with institution practice, responses to the review were solicited from the department and the dean. A final meeting took place on August 28, 2019. This document represents the final MOU of recommendations and findings from the review.

Signatures

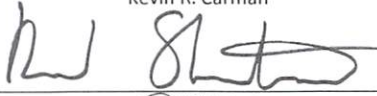
Executive Vice President &
Provost:



Kevin R. Carman

Date: 09/27/2019

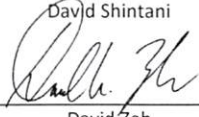
Vice Provost, Undergraduate
Education:



David Shintani

Date: 09/27/2019

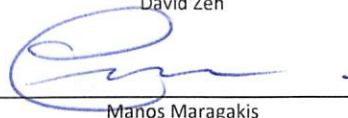
Vice Provost, Graduate Education
& Dean, Graduate School



David Zeh

Date: 09/27/2019

Dean, College of Engineering



Manos Maragakis

Date: 9/30/19

Chair, Department of Mechanical
Engineering



Miles Greiner

Date: 9/30/19

Major Findings and Conclusions

1. The move of the program to the newly renovated Palmer Engineering building, which allows faculty offices, classrooms and laboratories to be housed in a contiguous space has resulted in students spending higher quality time learning due to having these key resources in close proximity.
2. The program has attracted and retained talented faculty members, who along with the graduate students, publish in elite journals and secure very competitive research grants.
3. The shift of a majority of the graduate students from the master's to the doctoral program is a positive change and will help strengthen the quality of research.
4. The program is well aligned with goals of the college and collaborates well with administration.

Next Steps for this Program/Department (topics will vary)

1. Graduate Curriculum & Education

It was noted that the program has recently experienced a shift of students in the graduate program with the majority now in the Ph.D. program rather than the master's program. This shift was cited as a positive change that will improve the quality of research in the program. It was noted that the quality of students that come from undergraduate programs outside of UNR is at times lacking, which is a concern the program is aware of and seeks to improve. It was suggested that the Graduate School has programs to assist with the recruitment of students, both domestic and international, which is a program is interested in exploring further.

2. Curriculum—Undergraduate

The Mechanical Engineering program was noted as having well integrated facilities for undergraduate students in the newly renovated Palmer Engineering Building. It was observed that having all resources contiguously located allows students to spend higher quality time engaged in learning. Areas of desired improvement include the use of accurate assessment tools for continuous improvement and working to ensure that the student:faculty ratio is at a level that ensures a positive student-faculty interaction. The program is working to address both of these concerns.

The assessment tool realignment is an iterative process that is being addressed through the fundamentals of engineering exam, and the student:faculty ratios will need to be considered in collaboration with administration.

3. Space

Both at the undergraduate and graduate levels, the space provided to faculty and students was noted as being suitable, specifically due to recent renovation of the Palmer Engineering building, as described above. With the opening of the new engineering building, it is anticipated that space will not be an issue for the immediate future. It was also noted that the program in collaboration with administration has worked to provide support to new faculty in the forms of competitive salaries and start up packages, that, when coupled with the current facilities, is a positive step in attracting and retaining talented faculty.

4. Faculty

The faculty in Mechanical Engineering were noted as being talented, with publications in elite journals, and successful at securing competitive research grants, with particular accolades being directed at the chair for his leadership. Concerns were stated regarding the preponderance of faculty at the assistant professor level, which may result in a lack of mentoring and thus turnover among those same assistant professors. The low numbers of associate and full professors also create a constraint on those individuals available to teach upper division undergraduate and graduate courses, which may be a contributing factor in the low levels of enrollment in the graduate programs. With the addition of Advanced Manufacturing and Aerospace Engineering to the program, it was suggested that this would be an opportunity to bring in individuals at the associate and full professor levels, while also opening up avenues to work with defense agencies. The program recognizes the value of the current faculty and seeks to strengthen efforts in collaboration with administration to ensure their success and retention, while bringing in new faculty to support program growth. The current staffing levels that support faculty were cited as adequate at this time, but it was acknowledged by the reviewers and the program that program expansion will require increases in support staffing.

The department should keep in mind that it is the expectation at the university that tenured faculty in all departments continue to build a portfolio of scholarly work following achievement of tenure so as to move successfully through the promotional ranks to full professor.

Action Items:

- Starting in 2021, the program will work toward submitting a proposal to implement a minor, major and then advanced degrees in Aerospace Engineering.
- Build stronger relationships with Alumni and Industry partners to help identify opportunities for students both during time in the program and post-graduation.
- Develop incentives for faculty who participate in the Graduate School's Mentoring Mentors program.
- Explore collaborating with other Engineering programs to create a Gradventure opportunity with the Graduate School. This can assist in recruiting stronger students and domestic students.
- Work with college administration to address any gaps in Fluid Mechanics faculty on staff.
- Explore with faculty and develop a plan for lowering graduate credit requirements, particularly with regard to the PhD program.
- Comparison with peer institutions regarding program requirements will be completed. Using Curricular Analytics and Navigate (EAB), the college and department will examine degree pressure points (where students are not on track to be successful in the program), identify ways to simplify degree paths, and give advising to those students who appear not to be on a successful track. Emphasis on student success should be on both the undergraduate and graduate levels. This is being asked of all program across the University. The goal is to have reports by the end of the fall 2019 semester.

Vital Statistics on NSHE Reports

Bachelor of Science in Mechanical Engineering

Number of students with declared major in the program area 2018-19:	714
Number of graduates from the program, 2016-17:	132
Number of graduates from the program, 2017-18:	144
Number of graduates from the program, 2018-19:	168
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	1704

Masters of Science in Mechanical Engineering

Number of students with declared major in the program area 2018-19:	11
Number of graduates from the program, 2016-17:	7
Number of graduates from the program, 2017-18:	7
Number of graduates from the program, 2018-19:	6
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	96*

Ph.D. in Mechanical Engineering

Number of students with declared major in the program area 2018-19:	29
Number of graduates from the program, 2016-17:	2
Number of graduates from the program, 2017-18:	2
Number of graduates from the program, 2018-19:	4
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	96*

* Cannot differentiate between MS and PhD