Electrical and Biomedical Engineering Program Review 2018-19

Closing MOU

Date: August 27, 2019

Overview

Degree/Certificate Programs Reviewed:

Bachelor of Science in Electrical Engineering
Bachelor of Science in Engineering Physics
Bachelor of Science in Biomedical Engineering
Master of Science in Electrical Engineering
Master of Science in Biomedical Engineering
Ph.D. in Electrical Engineering
Ph.D. in Biomedical Engineering

Department Chair & Dean:

Sami Fadali, 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. Adele Doser, Sandia National Laboratories, Accreditation Board for Engineering and Technology (ABET)
Graduate:
Dr. Alyssa Panitch, Department of Biomedical Engineering, University of California Davis
Dr. Ehsan Jabbarzadeh, Department of Chemical and Biomedical Engineering, University of South Carolina
Dr. Edwin Yaz, Department of Electrical and Computer Engineering, Marquette University
Dr. Hossny Elsherief, Department of Electrical and Computer Engineering, University of California Riverside

Date of External Visit:

September 17-19, 2017 and March 7-8, 2019

Review Process Summary

The Electical and Biomedical Engineering programs were 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 April 1-2, 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 27, 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, Electrical and Biomedical Engineering	Sami Fadali	Date:	9/30/19

Major Findings and Conclusions

1. The program faculty is highly qualified with effective teaching records, and strong research productivity as indicated through publications and professional activities.
2. At the graduate level, the program has very high retention rates of nearly 100% and an excellent faculty to student ratio.
3. Both graduate and undergraduate students note that faculty are accessible and supportive in terms of mentoring, advising and providing individual attention.
4. The program has well-equipped laboratories to support undergraduate instruction and fulfill faculty and graduate student research needs.

Next Steps for this Program/Department

1. Strategic Planning and Building a Vision for the Department:

The Electrical and Biomedical programs were viewed as being highly productive and having a vision that was consistent with that of the college and university leadership. Areas that were identified as needing attention were: (1) the securing of external funding, which the program has recognized and taken steps to address through collaboration; (2) low graduate enrollment for an R1 institution of UNR's size, which the program intends to grow in parallel with external funding, and (3) low number of graduate teaching assistant (GTA) and graduate research assistant (GRA) lines. The recommendation to articulate the program's strategic plan, with regular reviews and updates was put forth, which the programs have begun to address with the formation of a Strategic Planning

Committee. Finally, greater collaboration with industry partners was suggested, which is an effort that the program has already begun exploring and identified partnerships to pursue.

2. **Graduate Curriculum & Education**

The graduate program was commended for having a high retention rate combined with low time to completion. It was recommended that Student Learning Outcomes (SLOs) and their related assessments be separated out between the Electrical and Biomedical programs to ensure both are meeting expectations. The Graduate Coordinators for each program will begin the process of separating out the assessments for these programs by their respective MS and PhD paths. The increase of course offerings via collaboration was suggested, particularly as it applies to the Biomedical program to ensure depth and breadth of offerings, which is an effort the that programs have been pursing and have brought forth changes. The low number of GTAs/GRAs was listed as a concern, which the program seeks to increase in parallel with increasing external funding, and the college has already provided support of this effort via an external funding matching structure, which was also recommended. Increasing enrollment was also encouraged, which the program seeks to address via closer collaboration with the Graduate School and participation in their programs, as well as securing funding that will attract students, particularly local and domestic students, such as GAANN grants from the U. S. Department of Education.

3. **Undergraduate Curriculum/Recruitment/Enrollment/Progression**

The undergraduate program was noted as having students that spoke highly of the faculty in terms of accessibility, mentoring and advising. It was also stated that the undergraduate laboratories were well equipped. Overall, there were no cited concerns or issues with the undergraduate program, the only suggestion made was to create a stronger pathway between the undergraduate and graduate programs. Faculty have already made efforts on this front by identifying strong candidates at the undergraduate senior level to attract to the graduate programs, and has opened discussions with the Graduate School about steps to be taken to increase efforts.

4. **Faculty**

The faculty within the Electrical and Biomedical programs were noted as being highly qualified, having effective teaching records, and strong research productivity. Areas of concern primarily focused on the topic of support. It was noted that the faculty operate with low administrative support which is addressed in short term increments via student employees. Additionally, it was discussed that faculty engage in a significant amount of pre- and post-proposal preparation, which may detract from time that could be spend on research or classroom activities. The program, in collaboration with the college and administration, is working to streamline processes and access to shared resources to reduce administrative workloads on the faculty.

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:

- The department and college will explore gaining ABET accreditation for the undergraduate Biomedical program.
- Implement separate assessments for EE and BME graduate programs.
- Continue to identify upper level course opportunities in other departments and create new ones within the program when possible.
- Pursue recruitment opportunities with Graduate School, particularly with the BME program, and look for chances to collaborate with programs and industry partners on recruitment efforts.

- 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. Goal is to have reports by the end of the fall 2019 semester.

Vital Statistics on NSHE Reports

Bachelor of Science in Electrical Engineering

Number of students with declared major in the program area 2018-19:	251
Number of graduates from the program, 2016-17:	45
Number of graduates from the program, 2017-18:	46
Number of graduates from the program, 2018-19:	43
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	853

Bachelor of Science in Engineering Physics

Number of students with declared major in the program area 2018-19:	9
Number of graduates from the program, 2016-17:	0
Number of graduates from the program, 2017-18:	1
Number of graduates from the program, 2018-19:	3
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	N/A

Bachelor of Science in Biomedical Engineering

Number of students with declared major in the program area 2018-19:	73
Number of graduates from the program, 2016-17:	N/A
Number of graduates from the program, 2017-18:	N/A
Number of graduates from the program, 2018-19:	4
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	21

Masters of Science in Electrical Engineering

Number of students with declared major in the program area 2018-19:	2
Number of graduates from the program, 2016-17:	4
Number of graduates from the program, 2017-18:	7
Number of graduates from the program, 2018-19:	1
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	35*

Masters of Science in Biomedical Engineering

Number of students with declared major in the program area 2018-19:	8
Number of graduates from the program, 2016-17:	1
Number of graduates from the program, 2017-18:	3
Number of graduates from the program, 2018-19:	3
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	13**

Ph.D. in Electrical Engineering

Number of students with declared major in the program area 2018-19:	17
Number of graduates from the program, 2016-17:	1
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:	35*

Ph.D. in Biomedical Engineering

Number of students with declared major in the program area 2018-19:	6
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:	0
Headcount of students enrolled in any course related to the program (duplicated), Fall 2018:	13**

* Cannot differentiate betweem MS and PhD
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