



**SAN JOSÉ STATE  
UNIVERSITY**

A Report from Outside Reviewer  
**Bachelor of Science in Electrical Engineering (BSEE)**  
**Program Review for the**  
Engineering Science Department  
School of Science and Technology  
Sonoma State University

Charles W. Davidson  
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### **Introduction**

This external review of the Bachelor of Science in Electrical Engineering (BSEE) Program of Engineering Science Department of School of Science and Technology at Sonoma State University is based on a comprehensive review of the provided Self-Study Program Review dated October 18, 2016 and a one day visit to the CSU Sonoma Campus on November 10, 2016.

During my one-day on campus visit, I followed the schedule provided to me by Dr. Ali Kujooory, which included meetings with the Department Chair (Dr. Farid Farahmand), a Tenure-Track faculty member (Dr. Brendan Hamel-Bissell, who is the only one full-time faculty member of the department, besides the department chair), three Adjunct faculty members (Dr. Ali Kujooory, Dr. Donald Estreich, and Dr. Sara Kassis), an Administrative staff (Ms. Ronnie Goodlund), twenty-four undergraduate (senior) electrical engineering students, the Dean of School of Science and Technology (Dr. Lynn Stauffer), and the Interim Provost of Sonoma State University (Dr. Jeri Echeverria). I also visited all department laboratories, including Rolf Illsley Photonics Laboratory, Electronic Laboratory, AFC Access Technologies Laboratory, Networking Laboratory, Senior Project Laboratory, and William Keck Microanalysis Laboratory.

The main discussion topics for each meeting listed above can be summarized as following. Dr. Farid Farahmand, the ES department chair described to me the overall current status of the ES department, the history of establishing the BSEE program in the ES department, and the overall process of senior projects. Dr. Ali Kujooory explained to me the process of accessing the program curriculum and recommendations for current improvement. Dr. Brendan Hamel-Bissell shared to me his feeling as a new tenure-track faculty in ES department and his work in research and student outreach since he joined ES department in August 2016. Dr. Donald Estreich shared to me his teaching pedagogy, his work in implementing engineering ethics in some EE courses, and discussed his plan in improving and sequencing current electronics courses. Dr. Sara Kassis showed me the process of advising and tracking student performance in order to guide them to succeed.



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I met and spoke to 24 senior students for 30 minutes. I explained to the students the purposes of my visit and asked them to share with me their experiences at SSU, including admission, student faculty interactions, EE curriculum, exams, homework assignments, projects, office hours, advising, laboratory, equipment, department and university supports, etc. All students talked very positive about the program, the faculty, and the department overall. They are very happy with the services that they have received from the department office as well as what they have learned from the faculty. Two students addressed that the curriculum is too difficult for them, such as the requirements in mathematics and physics. About half of the students believe that the number of units required for general education should be reduced and substituted by additional EE elective units.

I also had a 30-minute meeting with Dean Lynn Stauffer and 30-minute meeting with Provost Jeri Echeverria at the end of my visiting day. It is clear that the Engineering Science department had made a great visiting agenda for me to talk to all relevant personnel and I greatly appreciate the abundant hospitality that I have received. Everyone I met at Sonoma State University was friendly, welcoming, and very helpful.

Below are my observations and comments:

### Strengths

Faculty: A major strength that I observed during my campus visit is the quality and cohesiveness of the faculty and their enthusiasm in teaching and helping the students. I came away with a firm impression of a hardworking and committed faculty, who were cohesive, collegial, and displayed excellent working relationships. The morale of all faculty and staff, including adjunct faculty is very high. The working relationship between the faculty, students, and staff is excellent. I am very confident about the department chair, who was able to motivate adjunct faculty members to take extra effort in the department activities, including curriculum development, assessment, student recruitment, advising, etc.. Although the department has only 2 tenured/tenure-track faculty and 8 adjunct faculty members, the department has been able to fully function in the past decade with great student-to-faculty ratios of less than 17. *I encourage the department to maintain this great performance but with immediate attention to tenure-track faculty hiring as discussed in other section of this report.*

Courses and Laboratories: The program curriculum reflects a comprehensive thoughtful of strong faculty by emphasizing several specific areas instead of a broad spectrum in electrical engineering. In a short time period, faculty has come up with a curriculum of more than 20 EE seminar-only courses and 10 courses with laboratory components. This set of courses fully covers mandatory topics in circuits, photonics, communication, computer hardware and software systems. Moreover, the program includes a number of well-equipped mandatory laboratories to support its curriculum, which include electronic lab, communication lab, networking lab, human computer interaction lab, software engineering lab, etc. I found that most of the labs have very good resources and the department has developed a great procedure for accessing, using, and maintaining these labs. It is great to see that many well-prepared documents



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and manuals are available for students, including laboratory rules, equipment inventory and user guides, hardware and software user manuals, etc. *I encourage the department to maintain this great curriculum with the development of additional courses and labs as discussed in other section of this report.*

Senior (capstone) Projects: I was very impressed with the quality of senior project posters posted on the hallways on 2<sup>nd</sup> floor of Salazar building. These posters clearly reflect the enthusiasm of faculty advising and professionalism of senior students. According to the department chair, the department financially supports senior project students to recruit project assistants from Santa Rosa Junior College to help them in completing the project. This is a great learning curve for senior students in project management, collaboration, leadership, entrepreneurship and also a way for the department to attract potential new students into the program. *I strongly encourage the department to maintain this great process with some suggestions as below:*

- *EE project students to directly present their proposals at Santa Rosa Junior College (SRJC) instead of sending their proposals to SRJC counselors.*
- *EE senior students to collaborate with SSU science students for possible joint senior projects.*
- *Senior projects to be presented/displayed at university events and public (educational/scientific) events.*

Alumni Connection: From the assessment report provided to me before the visit, I learned that most of alumni responded to the department surveys. As shown in the report, the first group of 14 students graduated in 2010 and the number of alumni responded to alumni survey in 2014 is 8. This is a reflection of a department in which students feel nurtured and guided.

Academic Advising: Since the BSEE program at Sonoma State University is currently a small program, I applaud the idea of assigning each student an advising folder that is physically kept in the department office. Students are then required to pick up the advising folders before seeing their academic advisors. This process ensures the students with good feeling of having attention and that contributes to a great relationship between the department and the students. *In the future when the program became larger, this process may need to be revised such that advising folders to be digitally stored on the department servers and can be accessed online by academic advisors.*

## Challenges

Engineering Program and the University: The Engineering Science Department is the only department at Sonoma State University that has an undergraduate engineering program and a graduate engineering program. Since the graduate Master of Science in Computer and Engineering Science (MS-CES) program is a self-support program, the Bachelor of Science in Electrical Engineering (BSEE) program is the only undergraduate engineering program in the School of Science & Technology at Sonoma State University. Due to the fast changing in technology, the department may face difficult time in convincing the university to support some of its requests that is outside of the normal norm as



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viewed by other non-engineering programs, especially in laboratory equipment and program accreditation. Due to the fact that there are differences in college major choice across racial and ethnic groups, Sonoma State University needs to maintain and expand several engineering programs to some extent in order to serve a diverse community. *I encourage the department to continuously organize technology-related events on campus and maintain close relationships with other science programs such as physics, biology, computer sciences, etc. for mutual benefits. Inter-departmental collaborations can be in forms of cross-listing courses, joint student projects, faculty joint proposals and research projects, etc.*

Faculty and the Department: With the excellent level of commitment and dedication by all faculty members, the BSEE program has been able to maintain its operation in the past decade. Although the department has a very strong adjunct faculty pool, this resource of talent cannot make up for the lack of tenured/tenure-track faculty. In order to retain and even to improve the program to some extent so that it can be recognized nationally and to attract better qualified students, the program cannot continue to operate at the expense of adjunct faculty. *I applaud the dedication of current faculty members and strongly advocate for the request of immediate hiring tenure-track faculty. The university should authorize at least three tenure-track hires in continuous three years period to ensure the continued excellence of the program and to allow the preservation of high moral and productivity of the existing dedicated and collaborative faculty and staff. Due to that fact that the ratio of female/male engineering students is too much below the university average, it is great if the department can have highest priority in hiring female engineering faculty. With the current resource situation, tenure-track faculty members must be overloaded with both teaching and advising that is not possible for them to establish their research interests, not mentioning about the lack of graduate students to assist them in their research. Increasing supports for faculty research and scholarly work is necessary. Without enough support in creativity and scholarly work, the department will have hard-time in recruiting qualified and motivated tenure-track faculty as well as to retain them or to help them in the tenure process. Creating programs to help faculty retention and to support faculty research is critical for the program.*

Curriculum and Accreditation: The existing BSEE program curriculum is good and the process of curriculum assessment and development is on the right track. It is great to see that the department uses ABET recommendations to develop its own process in curriculum maintenance and improvement that involved all constituencies, including students, faculty, industry, alumni, etc. *Since FPGA (Field Programmable Gate Arrays) with Verilog HDL (Hardware Description Language) is common technology in EE-related areas, I suggest the department to develop a course and laboratory to cover this important technology. I also want to encourage the department to continue its effort in curriculum assessment and improvement and strongly support the department's plan in getting ABET accreditation for its BSEE program. Due to the lack of full-time faculty and research supports, I suggest the department to start apply for ABET accreditation after 2 years of maintaining 75% (or more) FTEF from full-time tenured/tenure-track faculty. Moreover, the current self-support master program should be converted into regular master program as soon as possible.*





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*It is a disadvantage to see that the department does not have any regular graduate program but only a self-support graduate program for quite many years.*

Laboratory and Equipment: Although the department has a number of well-equipped laboratories and laboratory spaces, *there are still several labs to be equipped with out-of-date personal computer systems. Using out-of-date computers will cost student studying time and technical staff productivity. Since average-performance personal computers today are cheap and can be easily supported by the college or the university through laboratory refreshment program or by student lab fees, I urge the department to take advantage of this support to improve computational power in these labs.*

Students: According to the assessment report provided to me before the visit, local high school graduates accepted in the program have minimum eligibility index (EI) of 2,900. *In order to help unprepared students to be successful in the program, I encourage the department to organize tutorial programs in mathematics, physics, and electrical engineering so that better prepared students can help unprepared students. Additionally, the department can organize optional workshops for some important EE courses during the semester break and/or summer so that students can get ready before taking these important courses. The department should spend more effort in student recruitment, especially female students, in order to expand the program and improve the quality of incoming students. It would be great if the department can coordinate with local high school teachers to organize on-site summer technology workshops with involvement of student organizations such as Society of Women Engineers, IEEE Student Chapter, etc.*