

New Academic Program: Bachelor of Science in Architectural Engineering

BACKGROUND

Program Proposed Start Date

Fall 2018

Program Description

Bachelor of Science (BS) in Architectural Engineering. The full program proposal is available at: <https://secure.oregonstate.edu/ap/cps/proposals/view/99017>

The proposed BS in Architectural Engineering (ARE) degree program will provide students with breadth and depth in the engineering sciences of buildings and their systems: structural systems; heating, ventilation and air-conditioning (HVAC) systems; electrical and lighting systems; and construction engineering and management. The program will emphasize integration across architectural engineering disciplines as well as with the existing civil engineering and construction engineering programs. The proposed ARE program will allow students to specialize in a chosen discipline while gaining the knowledge and skills to become leaders in the design and construction of green, energy efficient and more complex buildings.

Program Context

The Architectural Engineering (ARE) program will be administered within the School of Civil and Construction Engineering (CCE) and will build upon partnerships with Wood Science & Engineering (WSE) in the College of Forestry at Oregon State and the Department of Architecture at the University of Oregon. The proposed ARE program not only strongly leverages existing CCE courses in structural and construction engineering, for example, but benefits from a variety of possible WSE electives in advanced wood design, renewable materials and other topics. Among the opportunities for collaboration with the University of Oregon are courses from both campuses addressing different topics for sustainable and high-performance building design and construction. With new courses in the engineering of the building's heating, ventilation, air-conditioning, lighting and electrical systems, and building materials, the ARE program will be a comprehensive course of study in the engineering sciences of buildings and their systems, and one that is unique to Oregon State.

The proposed ARE program complements the existing Mt. Hood Community College (MHCC) Architectural Engineering Technology program by educating engineers who would work with the technicians who graduate with an MHCC Associate of Applied Science Degree. The proposed program may also provide additional opportunities for MHCC Architectural Engineering Technology graduates. As noted by Mike Brayson, MHCC Advisor of Architectural Engineering Technology, in his letter of support for the proposed degree program: "Technical tools and modeling software used in the AEC [architecture, engineering, and construction] market has evolved over the last decade ..." and "Oregon and the building construction industry needs a program like this. The application of these emerging technologies, in both scope and depth, goes well beyond what we can cover with a two year community college experience."

There is only one accredited Architectural Engineering bachelor degree granting program on the West Coast, at the California Polytechnic State University, San Luis Obispo. Geographically, the next closest Architectural Engineering bachelor degree programs are in Wyoming and Colorado. Oregon State's ARE program would fill a void in the western US. As such the program is likely

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to attract students from other regions of the U.S. as well as Oregon residents.

Program Purpose/Relationship to University Mission and Strategic Plan

The proposed ARE program supports OSU's strategic goals of demonstrating leadership in research, scholarship and creativity, and of strengthening impact and reach throughout Oregon and beyond (<https://leadership.oregonstate.edu/provost/osu-strategic-plan>). Most notably, the ARE program will advance OSU's signature area: Advancing the Science of Sustainable Earth Ecosystems. The proposed program also has its own goals for recruiting female students and other underrepresented groups, thus implementing one strategy of OSU's goal to provide a transformative educational experience for all learners.

New ARE courses and faculty will broaden the school's impact in the signature area of advancing the science of sustainable earth ecosystems, to now encompass the ecological footprint associated with building energy efficiency and sustainable design and construction practices. Advances may have emphasis in building energy efficiency from groundbreaking to possible demolition, or design for deconstruction and reuse. The proposed program would be one of only two ARE programs in the western U.S. Furthermore, the partnerships with WSE and University of Oregon Architecture create an ARE program that is unique to Oregon State University and will be *the* program for architectural engineering of sustainable wood-frame buildings. The diverse nature of Architectural Engineering and its disciplines will attract new students to the school and serve the changing demographic in Oregon and the region. Engagement and collaboration with an industrial advisory board will ensure that the ARE program is serving the needs of the industry. In this manner, the proposed ARE program is expected to enhance OSU's impact nationwide.

Need for the Program

By some sources, the projected job growth for architectural engineers in the U.S. could be as high as 20% for the period between 2012 and 2022¹. Meanwhile, in a case study of Oregon State University's future opportunities in the Portland region through 2025, Architectural Engineering was one of less than a dozen engineering disciplines that scored "high" for "economic opportunity and demand" and one of only three engineering disciplines to score "high" for "learner demand."² Yet Oregon and Washington together have fewer than 20 Architectural Engineering Institute (AEI) members, compared to over 350 in states like California and Pennsylvania, highlighting the potential for the proposed ARE program to fill a void in the Pacific Northwest.

Letters and other documented support from CCE Industrial Advisory Board (IAB) members and other leaders in design and construction underscore the need for the proposed program. One industry leader commented, "...there are very, very few programs that are tailored to this specific application of engineering. For example, our consulting company has been actively searching for an electrical engineer for several years, with no success. We get applications from software engineers, power generation and transmission engineers, electronics engineers, and the like but none of them knows anything about building systems. Kudos to you and the University for recognizing this need and stepping up to fill it!"³ Another noted that there is "absolutely a need" for engineers with the proposed ARE degree, because the green building

¹ http://study.com/articles/Architectural_Engineers_Job_Description_and_Requirements_for_a_Career_in_Architectural_Engineering.html

² "Oregon State University in Portland: A case study," Oregon State University, Office of the Provost, March 19, 2017.

³ <https://secure.oregonstate.edu/ap/cps/proposals/view/99017>

industry is “booming.”³ The past-President of AEI commented on the need for integrated building solutions for energy conservation and ARE graduates’ unique capabilities as “building integrators,” endorsing the proposal for “this much needed program in the northwestern region of the United States.”³ IAB members stated that the addition of ARE will allow “OSU to expand its impact” as a leader in building construction and “meet the needs of the construction industry in Oregon and throughout the US.”³

Program Financials

The College of Engineering has planned to add two new ARE faculty members. The annual cost for ARE in terms of tenure track faculty, professional faculty and teaching assistants is \$228,696 for the first year and \$402,787 for the second year as outlined in the budget. CCE works with the faculty candidates to determine the equipment that they will need for their research. Toward this effort, we are budgeting \$75,000 for permanent equipment for each faculty member. This start-up package will include computers, software and laboratory items. The graduate teaching assistant salary will be covered from the CCE budget as is currently done for all classes in the School of Civil and Construction Engineering. For the program to be successful, there will need to be some administrative and advising support. We expect, for example, that the CCE Operations Manager and communications professional will need to devote approximately 10% of her annual effort to this program.

The costs of student recruiting visits, program promotion and management of the ARE program will be paid using the existing budget within the School of Civil and Construction Engineering. The recommendation from the Library Evaluation has also been included in the proposed budget.

The projected expenses are provided in the budget table below. Resources are summarized in the proposal budget information.

	Academic Year 2019	Academic Year 2020	Academic Year 2021	Academic Year 2022
Personnel				
Faculty	\$90,000	\$183,600	\$187,272	\$191,017
Graduate Assistants	\$34,794	\$70,980	\$72,399	\$73,847
Support staff	\$40,586	\$41,397	\$42,225	\$43,070
OPE	\$63,316	\$106,810	\$108,947	\$111,126
Personnel Subtotal	\$228,696	\$402,787	\$410,843	\$419,060
Other Expenses				
Library, Equipment	\$77,224	\$77,357	\$2,499	\$2,650
Other Expenses Subtotal	\$77,224	\$77,357	\$2,499	\$2,650
GRAND TOTAL	\$305,920	\$480,144	\$413,342	\$421,710

RECOMMENDATION

All appropriate University committees and the OSU Faculty Senate have positively reviewed the proposed program. The Provost recommends that the Academic Strategies Committee recommend to the Board that it approve the establishment of an instructional program leading to a BS degree in Architectural Engineering, effective in Fall 2018, pending the support of the Statewide Provosts Council and the approval of the Higher Education Coordinating Commission.