Proposal Transmittal Sheet
Full Category I and Abbreviated Category I Proposals

Submit proposals to: Office of Academic Programs, Assessment, and Accreditation
314 Waldo Hall – Oregon State University

Materials linked from the January 9, 2020 Faculty Senate agenda.

Full Category I Proposals: New Programs
Final Approval—for new degrees, extension to OSU’s branch campus, and substantive changes:
Higher Education Coordinating Commission (HECC)
Final Approval—for new certificate programs: OSU Provost

Check one:

☐ New Degree Program
☐ New Certificate Program
☐ Extend Program to OSU Branch Campus
☐ Substantive Change

Abbreviated Category I Proposals: Other Proposals
Final Approval—for new academic units, renames, reorganizations, and, suspensions: OSU Provost
Final Approval—for terminations: OSU Board of Trustees

Check one:

☐ Establish: new college, school, department or program
☐ Rename: change the name of an existing academic program or academic unit
☐ Reorganization: move the responsibility of an academic program from one academic unit to another; reorganize existing academic unit(s), including mergers and splits
☐ Suspension (or Reactivation): suspend an academic program (maximum period: three years)
☐ Termination: terminate an academic program or academic unit

Title of Proposal:
OSU-Cascades Bachelor of Science in Engineering Science

School/Department/Program:
n/a

College:
College of Engineering

Proposed Effective Term:
Fall 2020

I certify that the above proposal has been reviewed by the appropriate Program, Department, School, and College administrators and committees. I approve this proposal.

Sign (College Dean)  Date 1/15/19
Julie Gess-Newsome

Sign (Dean of Academic Affairs, OSU-C)  Date 1/15/19
Rebecca Johnson

Sign (VP, OSU-Cascades)  Date

Print (College Dean)  Print (Dean of Academic Affair, OSU-C)
Julie Gess-Newsome  Rebecca Johnson

Print (VP, OSU-Cascades)
Institution: Oregon State University
College/School: College of Engineering
Department/Program: BS, Engineering Science

Executive Summary

An Engineering Science (ESC) program designed to provide students with a strong foundation in engineering fundamentals is proposed. The base of the T-shaped curriculum is a common core built from select courses across several engineering disciplines (industrial, electrical, and mechanical) as well as the science and mathematics courses required by those programs. The depth of the curriculum is provided by technical electives. Electives from a variety of different engineering disciplines will be offered, and students can specialize by taking courses focused in a single area. The degree awarded will be a Bachelor of Science in Engineering Science. Some of the many fields students graduating from this program will be ready to work in are industrial, electrical, mechanical, design, and process engineering. Additionally, they will be eligible for graduate studies in any of these fields. It should also be noted that some of the engineering science programs currently in place across the country are used as a launch pad for medical or law school. This is a goal of this program as well.

The Engineering Science program will be offered face-to-face at the Oregon State University-Cascades (OSU-Cascades) campus in Bend. This will be the second engineering program offered at this location. The Energy Systems Engineering program, the first OSU-Cascades engineering program, was established in 2010 and has experienced steady enrollment growth since its inception. It currently has 117 students. The population change of Deschutes County, where OSU-Cascades is located, from April 1, 2010 to July 1, 2016 was reported by the US Census to be 14.9% [1]. Additionally, the Bend-Redmond metropolitan area was the third-fastest-growing area of this kind from July 2015 to July 2016 [2]. The Bureau of Labor Statistics projects employment of mechanical engineers will grow by 5% from 2014 to 2024 while that of electrical and industrial engineers will hold steady [3]. The population growth of central Oregon paired with this employment data demonstrates a strong need for the proposed ESC program in Bend. Finally, there are only eleven ABET accredited engineering science programs in the nation. Just over half of those ABET accredited programs are offered at public institutions, the closest of which is located at Colorado State University.

An investigation of similar programs at peer and aspirational peer institutions was performed and their curriculum used as a model. The proposed ESC curriculum meets the Accreditation Board for Engineering and Technology (ABET) general criteria for baccalaureate level programs and covers all the topics needed for students to sit for their professional engineer (PE) licensure exam. It should be noted that some of the top undergraduate engineering schools in the country (e.g. Harvey Mudd College and Olin College) offer similar programs. Additionally, Pennsylvania State University, also a land, space, sun, and sea grant institution, offers an engineering science program as part of its honor college. Due to the multidisciplinary nature of the proposed program, which will be housed in the College of Engineering, the curriculum can be constructed largely from existing engineering classes. The impact and uniqueness of the program is through a thoughtful integration of courses across disciplines rather than the creation of new courses. Therefore only four unique courses are required, allowing for fast implementation. A staffing plan for the proposed program has been mapped out and budgeted for by OSU-Cascades.

Proposal for a New Academic Program

Institution: Oregon State University (Cascades Campus)
College/School: College of Engineering
Department/Program Name: Engineering Science
Degree and Program Title: BSES, Bachelor of Science in Engineering Science

1. Program Description
   a. Proposed Classification of Instructional Programs (CIP) number. 14.1301
   b. Brief overview of proposed program
      An engineering program must prepare students for not only today’s technological and societal challenges but also those of the future. These challenges are becoming more and more complex as well as multidisciplinary in nature. An engineering science program that provides the students with a strong, broad foundation in engineering fundamentals rather than in a specific engineering discipline is proposed for this reason. The objective of this proposed program would be to prepare students to be engineers but not pigeonhole them into a single discipline therefore addressing the emerging need for dynamic, agile, and flexible engineers [1].

      The disciplinary foundation of the proposed engineering science program is engineering. The degree awarded upon completion of this program would be a Bachelor of Science in Engineering Science. The curriculum would have a common core built from select courses across several engineering disciplines (industrial, electrical, and mechanical) as well as the science and mathematics courses required by all these programs. Technical electives in these different disciplines would be offered allowing a student to either gain exposure to several different fields by taking an assortment of those courses or to specialize in a particular area by taking technical electives focused in one of the concentration areas. An investigation of similar programs at peer and aspirational peer institutions was performed and their curriculum used as a model. It should be noted that some of the top engineering schools in the country (e.g. Harvey Mudd College and Olin College) offer similar programs. Additionally, Pennsylvania State University, also a land, space, sun, and sea grant offers an engineering science program as part of its honor college.

   c. Course of study
      The proposed curriculum for the four year, engineering science baccalaureate degree is detailed in Table 1. The degree is 180 credit hours of work, as required for a bachelor of science by Oregon State University. Eighty-two credit hours are in the major and sixty-one
of those credit hours are at the upper division. In the proposed curriculum, every term requires a minimum of 12 credit hours, ensuring full-time status for students receiving financial aid. All existing courses leveraged by this degree were integrated into the curriculum during the quarter they are traditionally offered to prevent multiple offerings and ensure maximum enrollment.

Table 1: Four-year Engineering Science curriculum.
<table>
<thead>
<tr>
<th>Year 1</th>
<th>Term</th>
<th>Course No</th>
<th>Course Title</th>
<th>CH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CH 231</td>
<td>General Chemistry</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>CH 261</td>
<td>Laboratory for Chemistry 231</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>MTH 251</td>
<td>Differential Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>WR 121</td>
<td>English Composition</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>ESC 111</td>
<td>Introduction to Engineering</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1, Fall term, CH total</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>CH 232</td>
<td>General Chemistry</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>MTH 252</td>
<td>Integral Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>CS 161</td>
<td>Introduction to Computer Science I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>XXX XXX</td>
<td>Perspectives - Social Processes and Institutions</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1, Winter term, CH total</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>MTH 254</td>
<td>Vector Calculus I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>COMM 111</td>
<td>Public Speaking</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>CS 162</td>
<td>Introduction to Computer Science II</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>XXX XXX</td>
<td>Perspectives - Western Culture</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1, Spring term, CH total</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 1, CH total</td>
<td>44</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Year 2</th>
<th>Term</th>
<th>Course No</th>
<th>Course Title</th>
<th>CH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MTH 256</td>
<td>Applied Differential Equations</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>PH 211</td>
<td>General Physics with Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>ENGR 201</td>
<td>Electrical Fundamentals I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>ENGR 211</td>
<td>Statics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 2, Fall term, CH total</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>MTH 264</td>
<td>Introduction to Matrix Algebra</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>PH 212</td>
<td>General Physics with Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>ENGR 212</td>
<td>Dynamics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>WR 327</td>
<td>Technical Writing</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>ENGR 202</td>
<td>Electrical Fundamentals II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 2, Winter term, CH total</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>ST 314</td>
<td>Introduction to Statistics for Engineers</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>PH 213</td>
<td>General Physics with Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>ENGR 248</td>
<td>Engineering Graphics - 3-D Modeling</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>ENGR 203</td>
<td>Electrical Fundamentals III</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>XXX XXX</td>
<td>Perspectives - Biological Science</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 2, Spring term, CH total</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Year 2, CH total</td>
<td>46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 continued on next page.
Overall, 54 credit hours of baccalaureate core classes are integrated into the proposed curriculum. Table 2 provides a detailed mapping. All baccalaureate core requirements are met.
Table 2: Mapping of baccalaureate core courses required by the proposed curriculum.

<table>
<thead>
<tr>
<th>Baccalaureate Core Courses</th>
<th>Area</th>
<th>Title</th>
<th>CH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills</td>
<td>Fitness</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td>MTH 251 - Differential Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Speech</td>
<td>COM 111 - Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Writing I</td>
<td>WR 121 - English Composition</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Writing II</td>
<td>WR 327 - Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>Perspective</td>
<td>Biological Science</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cultural Diversity</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Literature and Arts</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Physical Science</td>
<td>PH 211 - Physics with Calculus</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Physical Science</td>
<td>CH 231+261</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Social Processes and Institutions</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Western Culture</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Difference, Power, and Discrimination</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Contemporary Global Issues</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Science, Technology, and Society</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>WIC</td>
<td>Writing Intensive Course</td>
<td>ESC Capstone Design</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Writing Intensive Course</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Totals                    | Skills                | 16                                        |
|                          | Perspective           | 28                                        |
|                          | Synthesis             | 6                                         |
|                          | WIC                   | 4                                         |
|                          | Overall Total         | 54                                        |

Initially, the proposed Engineering Science Program will offer the curriculum outlined in Table 1. Due to the multidisciplinary nature of the proposed program, the curriculum was purposefully constructed from existing engineering classes wherever possible. The impact and uniqueness of the program should be through exposure to courses across disciplines. Therefore the content of existing courses was carefully reviewed and those that mapped to
the goals of the proposed program adopted. The result was only four unique courses will need to be created. As the program grows, concentrations in different engineering fields will be offered. Students will be allowed to substitute technical electives in their area of concentration for the upper level engineering courses required by the base Engineering Science Program. The timing and order these concentrations will be offered in will be decided by enrollment, demand and facilities. Specific courses for those concentrations have not yet been identified, they will be dictated by the expertise of the faculty hired. An example of how a concentration would be implemented is provided:

Energy Systems Engineering Concentration: replace from Years 3 and 4 Curricula any three of the following courses: ECE 322, IE 425, IE 415, CS 290, ME 331, or ESC 350 with ESE 355, ESE 450, and ESE 471. Additionally, students will be given the option of a capstone design project focused in their concentration area.

d. Program Delivery

The Engineering Science program will be housed in the College of Engineering. The program will be offered face-to-face at the OSU-Cascades campus in Bend. The first two years of the program includes courses that can be taken at OSU-Cascades or community college. The second two years must be taken at OSU-Cascades. Following the same performance based model used by many of the other schools in the College of Engineering continued enrollment in the program will be based on cumulative OSU GPA and successful course completion rate.

e. Faculty:

The proposed program is composed of forty-five classes that are already offered at OSU-Cascades (baccalaureate core, general engineering, mechanical engineering, electrical engineering, industrial engineering, and business), four new offerings (highlighted in gray in Table 1), and three courses offered already in main campus (in italics in Table 1), but not yet offered at OSU-Cascades. It should be noted that ESC 497/498 are listed in Table 1, and may appear to be new offerings, but will be cross-listed with the currently offered ESE 497/498. Given this significant overlap and the projected enrollment shown in Fig. 2 (located in Section 4a), the following staffing plan for engineering specific faculty is proposed:

- AY 2019 – 2020: Instructor
- AY 2020 – 2021: Part-time instructors (Two individuals to teach one course each)
- AY 2021 – 2022: Instructor and part-time instructors (Four individuals - one course each)
- AY 2022 – 2023: Tenure track assistant professor

The initial instructor hire will cover the new offerings. Initially, the remaining courses that overlap the ESE program will be taught by the current ESE faculty: two Instructors, one Assistant Professor, and one Associate Professor. These faculty all hold a PhD and have extensive industrial experience. As Engineering Science enrollment grows more ESE courses will be over capacity and additional sections will need to be offered, so a second instructor hire is proposed in AY 2021 – 2022. Finally, the proposed concentrations will require
additional coverage. Assuming a start date of September 2019, historical enrollment data for the Energy Systems Engineering program, and the projected Engineering Science enrollment, it is proposed that an engineering (discipline – to be determined) tenure track hire be made in AY 2022 – 2023. This individual should be followed by a second tenure track hire in a different engineering field to ensure research in all engineering disciplines covered by the program are represented.

f. Adequacy of faculty resources – full-time, part-time, adjunct.
   Part-time faculty will be used judiciously to enhance program offerings. In the past, the ESE program garnered very good accreditation reviews due to the use of excellent, well-experienced part-time faculty from the community. A similar approach will be employed by this program. It is anticipated that part-time faculty will be hired in AY 2020 – 2021 and AY 2021 – 2022 to cover a total of six courses. Additionally, 1/3 of an advisor will be added for every 100 students enrolled.

g. Other staff.
   Recruitment, enrollment, and advising will be handled by current staff until program growth dictates the addition of new staff members.

h. Adequacy of facilities, library, and other resources.
   The proposed program would add six new classes to the curriculum and, with growth, would require additional sections of existing courses. Seventy-five percent of the courses require a standard classroom, a need that can be met with the existing facilities. The remaining courses, highlighted in Table 3, require special facilities. Those facilities, with the exception of a machine shop, are currently available at OSU – Cascades in the form of the chemistry laboratory (TYK 304) and the flex laboratory (TYK 310). Table 4 quantifies the increased demand the proposed program would put on these two rooms. Even the largest demand, 10 hours in the fall, can be met with the existing facilities. Additionally, a new STEAM-focused building, scheduled for 2021, will completely address any additional burden associated with this new program. That new building will also address the need for a machine shop. In the interim, temporary shop space will be rented from one of the many facilities in Bend. Bend High School, Central Oregon Community College, and the DIY Cave all have exceptional facilities that can be rented in the short-term.

The adequacy of the library is addressed by the attached letter of support.

**Table 3:** Courses requiring special facilities.
<table>
<thead>
<tr>
<th>Year 3</th>
<th>Term</th>
<th>Course No</th>
<th>Course Title</th>
<th>TYK 310</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>ECE 322</td>
<td>Electronics I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>ESC 340</td>
<td>Introduction to Experimentation</td>
<td>TYK 310</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>ESC 350</td>
<td>Engineering Materials</td>
<td>TYK 310</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 4</th>
<th>Term</th>
<th>Course No</th>
<th>Course Title</th>
<th>TYK 310</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>ESC 497</td>
<td>ESC Capstone Design</td>
<td>Shop</td>
</tr>
<tr>
<td></td>
<td>Winter</td>
<td>ESC 498</td>
<td>ESC Capstone Design</td>
<td>Shop</td>
</tr>
</tbody>
</table>

Table 3: continued on next page

Table 4: Additional hours the OSU-Cascade laboratories will be utilized by this program.

<table>
<thead>
<tr>
<th>Term</th>
<th>Room</th>
<th>Additional Hours (per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>TYK 310</td>
<td>10</td>
</tr>
<tr>
<td>Fall</td>
<td>TYK 304</td>
<td>3</td>
</tr>
<tr>
<td>Winter</td>
<td>TYK 310</td>
<td>4</td>
</tr>
<tr>
<td>Spring</td>
<td>TYK 310</td>
<td>8</td>
</tr>
</tbody>
</table>

i. Anticipated start date:
The first year this program would be offered fall 2019.

2. Relationship to Mission and Goals
   a. Manner in which the proposed program supports the institution’s mission, signature areas of focus, and strategic priorities.

   The addition of the proposed program would be in strong alignment with the mission of Oregon State University. An engineering science program would provide the people of Oregon and beyond, through education and research, the skills needed to improve economic and environmental progress directly and social and cultural progress indirectly. For example, consider Amar Bose and the company he founded in 1964, the Bose Corporation. In 2015, Bose had 3.5 billion in sales. The Bose product line includes an energy efficient series that uses 50% less energy than comparable sound systems. Like many products today, Bose headphones and speakers are an excellent example of engineering growing economic and environmental progress. Bose products indirectly improve social and cultural progress as well through the delivery of music of all types to people of all types. There is a multitude of examples of this kind. A student with a broad engineering background steeped in fundamentals, like that provided by the proposed program, would be well poised to continue this tradition. It should also be noted that some schools advertise engineering science programs as launch pads for law and medical degrees, which only further emphasizes the alignment of such a program with OSU’s mission. Finally, by adding an Engineering Science Program, OSU would be expanding their engineering offerings to include a program already
offered by Pennsylvania State University (PSU), the other land, sea, space, sun grant university. Currently US News ranks OSU #143 for National Universities and #75 for Best Undergraduate Engineering Programs while PSU is ranked #50 and #18 respectively.

Because today’s technological and societal challenges are becoming more and more complex and multidisciplinary in nature, the proposed program would provide students with a strong, broad foundation in engineering fundamentals rather than in a specific engineering discipline. A comprehensive program of this nature would provide students with the solid background required to contribute to any of the three Signature Areas identified in the OSU mission statement. For example, through their training in electrical fundamentals, electronics, and energy distribution, a student in the proposed Engineering Science Program could work as a power engineer for a wind turbine company, addressing Advancing Science in Sustainable Earth Ecosystems. A student taking engineering graphics, material science, and capstone design could be employed in the medical device field, addressing Improving Human Health and Wellness. Historically engineers have been Promoting Economic Growth and Social Progress, so students of this program would be well-positioned to continue doing so.

It is stated on the Oregon State University – Cascades website that the campus strives to be a ‘major contributor to the vitality of the unique Central Oregon community and environment’. The population change of Deschutes County, where OSU-Cascades is located, from April 1, 2010 to July 1, 2016 was reported by the US Census to be 14.9% [2]. Additionally, the Bend-Redmond metropolitan area was the third-fastest-growing area of this kind from July 2015 to July 2016 [3]. Therefore, providing a second strong engineering program to the rapidly growing Central Oregon region is directly in line with this campus goal. Additionally, Cascades has stated that ‘it will be a destination of choice for students, faculty and staff seeking teaching and research excellence within a dynamic, inclusive and student-centered campus community’. The proposed program by definition is dynamic. Its inherent flexibility will allow both students and faculty to essentially ‘choose their own adventure’. Studies indicate this generation highly values both feeling valued and adventure. The proposed program directly addresses these values which makes the proposed program and therefore OSU- Cascades a destination of choice.

3. **Accreditation**

The engineering science curriculum falls under the Accreditation Board for Engineering and Technology (ABET) general criteria for baccalaureate level programs. ABET guidelines state that the program curriculum must include:

- a minimum of 30 semester credit hours (45 quarter credit hours) of a combination of college-level mathematics and basic sciences with experimental experience appropriate to the program
- a minimum of 45 semester credit hours (67.5 quarter credit hours) of engineering topics appropriate to the program, consisting of engineering and computer sciences and engineering design, and utilizing modern engineering tools
- a broad education component that complements the technical content of the curriculum and is consistent with the program educational objectives
• a culminating major engineering design experience that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier course work.

All ABET curriculum specifications are met by the proposed curriculum as is detailed in Table 5. There are over 45 CH of college level math and science. The ABET requirements indicate some of these courses should have experimental experience. Thirty-six percent of the math and science courses of the proposed curriculum have an experimental component. The number of credit hours required for engineering topics is 67.5; the proposed curriculum has 95 CH. Included are engineering, computer sciences, and engineering design courses, as required. Given the nature of the proposed program, the curriculum is inherently broad. In addition, of the 180 CH, 50 CH are neither math, science, nor engineering in nature, therefore the broad education requirement is well met. Finally, the curriculum includes ESC 497/498 which is the two quarter long capstone design experience, which solidly addresses the last of ABET guidelines.

**Table 5:** Comparison of credit hours in curriculum dedicated to each ABET curriculum specification and number of credit hours required.

<table>
<thead>
<tr>
<th>Course No</th>
<th>Title</th>
<th>CH</th>
<th>ABET Required CH</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTH 251</td>
<td>Differential Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MTH 252</td>
<td>Integral Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MTH 254</td>
<td>Vector Calculus I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MTH 256</td>
<td>Applied Differential Equations</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MTH 264</td>
<td>Introduction to Matrix Algebra</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>ST 314</td>
<td>Introduction to Statistics for Engineers</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CH 231</td>
<td>General Chemistry</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CH 261</td>
<td>Laboratory for Chemistry 231</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CH 232</td>
<td>General Chemistry</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PH 211</td>
<td>General Physics with Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PH 212</td>
<td>General Physics with Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PH 213</td>
<td>General Physics with Calculus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>XXX XXX</td>
<td>Perspectives - Biological Science</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Math and Science Total</td>
<td>47</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Math and Science Courses with Experimental Component</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>ENGR 201</td>
<td>Electrical Fundamentals I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGR 211</td>
<td>Statics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGR 212</td>
<td>Dynamics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>ENGR 202</td>
<td>Electrical Fundamentals II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGR 248</td>
<td>Engineering Graphics - 3-D Modeling</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGR 203</td>
<td>Electrical Fundamentals III</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGR 390</td>
<td>Engineering Economy</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ESC 111</td>
<td>Introduction to Engineering</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ESC 440</td>
<td>Computational Methods for Engineers</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ESC 340</td>
<td>Introduction to Experimentation</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ESC 350</td>
<td>Engineering Materials</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ESC 497</td>
<td>ESC Capstone Design</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ESC 498</td>
<td>ESC Capstone Design</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ESE 330</td>
<td>Systems</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ESE 430</td>
<td>Feedback Control Systems</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ESE 470</td>
<td>Energy Distribution Systems</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ME 311</td>
<td>Intro to Thermal - Fluid Sciences</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ME 331</td>
<td>Introductory Fluid Mechanics</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ECE 271/272</td>
<td>Digital Logic Design Laboratory</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ECE 322</td>
<td>Electronics I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>IE 425</td>
<td>Industrial Systems Optimization</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>IE 415</td>
<td>Simulation and Decision Support Systems</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>IE 471</td>
<td>Project Management for Engineers</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CS 161</td>
<td>Introduction to Computer Science I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CS 162</td>
<td>Introduction to Computer Science II</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CS 290</td>
<td>Web Development</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Engineering Total</strong></td>
<td><strong>95</strong></td>
<td><strong>67.5</strong></td>
</tr>
</tbody>
</table>

Table 5 continued on next page

Accreditation of this program will be sought. ABET program eligibility requirements indicate a program must have one graduate before requesting an initial accreditation review. Based on the proposed timeline, a review could be requested in 2023. The majority of the programs within the College of Engineering are accredited, therefore, guidelines are already in place and will be used during the years prior to the initial visit to ensure a successful review.

4. **Need**
   
a. Anticipated fall term headcount and FTE enrollment over each of the next five years.

   The OSU-Cascades Energy Systems Engineering (ESE) Program was established in 2010. It is the only engineering program of its kind offered in the state of Oregon and one of five accredited programs in the country. The program has had strong enrollment growth as demonstrated by the graduation numbers shown in Figure 1. The proposed Engineering Science would also be the only one in Oregon. Additionally, there are only eleven ABET
accredited engineering science programs in the nation. Just over half of these programs are offered at public institutions, with the closest housed at Colorado State University. Enrollment trends comparable to that of the Energy Systems Engineering Program are expected for the Engineering Science Program due to these similarities. Projected enrollment for the next five years is shown in Figure 2. Note, each year five transfer students are expected to enter the program during their junior year. This is based on trends experienced in the ESE program.

![Bar chart](image1.png)

**Figure 1:** Number of graduates from the Energy Systems Engineering program in the past five years.

![Bar chart](image2.png)

**Figure 2:** Engineering Science enrollment projections

b. Expected degrees/certificates produced over the next five years.
It is anticipated that ten engineering science baccalaureate degrees will be awarded in spring 2022. In the five years that follow, trends similar to that shown in Figure 1 are expected. The only degree conferred by the program will be a Bachelor of Science in engineering science.

c. Characteristics of students to be served (resident/nonresident/international; traditional/nontraditional; full-time/part-time, etc.).

This program will serve resident, nonresident, and international students. It will be composed of traditional and nontraditional as well as full-time and part-time students.

d. Evidence of market demand.

Only three of the seven public institutions of higher education in Oregon offer engineering programs. None of those intuitions currently offer an engineering science (or similar) program. The ability to customize as well as the flexibility of this program will appeal to today’s student as it directly addresses many of the values attributed to millennials [4]. An engineering science program would provide an additional program for the large engineering student body at OSU. Although the proposed program is broad, the opportunity for areas of concentration in more traditional engineering disciplines would attract students interested in but not eligible for the OSU-Corvallis programs.

c. If the program’s location is shared with another similar Oregon public university program, the proposal should provide externally validated evidence of need (e.g., surveys, focus groups, documented requests, occupational/employment statistics and forecasts).

This program’s location will not be shared with similar programs. Additionally, this will be the only program of its kind offered at a public institution in Oregon.

f. Estimate the prospects for success of program graduates (employment or graduate school) and consideration of licensure, if appropriate. What are the expected career paths for students in this program?

The proposed engineering science program that would provide students with a strong, broad foundation in engineering fundamentals rather than in a specific engineering discipline is proposed. The product would be dynamic, agile, and flexible engineers capable of doing a variety of engineering jobs rather than only one specific discipline. Some of the many fields students graduating from this program would be ready to work in are industrial, electrical, mechanical, design, and process engineering. Additionally, they would be eligible for graduate studies in any of these fields. It should also be noted that some of the engineering science programs currently in place across the country are used as a launch pad for medical or law school. This would be a goal of this program as well.

Two national databases indicate a 6% employment growth rate in general engineering. Additionally, Central Oregon business community members were asked if they felt a student with an engineering science degree would be employable. Those polled were from a variety of different areas including biotech, venture capital, aerospace engineering, and the Oregon Department of Energy. The response was overwhelmingly yes. The professional engineer (PE) licensure is often earned by engineers (but is not necessary). The license requires a Bachelor’s degree in Engineering from an ABET accredited school, demonstrable
engineering experience under the supervision of another licensed engineer, as well as successful completion of two tests. The first exam, the fundamentals of engineering (FE) test is offered in seven different disciplines. It is anticipated that students from this program would take FE Other Disciplines. The topics covered by this FE exam include: math; probability and statistics; chemistry; instrumentation and data acquisition; ethics and professional practice; safety, health, and environment; engineering economics; statics; dynamics; strength of materials; materials science; fluid mechanics; electricity, power, and magnetism; heat, mass, and energy transfer. Those topics are mapped to the proposed curriculum in Table 6. In general, each topic is covered in multiple courses. Additionally, the Central Oregon Professional Engineers of Oregon indicated they felt the engineering science program would prepare students to successfully obtain their PE.

Table 6: Courses in the proposed curriculum mapped to FE topics

<table>
<thead>
<tr>
<th>Course No</th>
<th>Course Title</th>
<th>FE Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 231</td>
<td>General Chemistry</td>
<td>Chemistry</td>
</tr>
<tr>
<td>CH 261</td>
<td>Laboratory for Chemistry 231</td>
<td>Chemistry</td>
</tr>
<tr>
<td>MTH 251</td>
<td>Differential Calculus</td>
<td>Mathematics and Advanced Engineering Mathematics</td>
</tr>
<tr>
<td>ESC 111</td>
<td>Introduction to Engineering</td>
<td>Ethics and Professional Practice; Safety, Health, and Environment</td>
</tr>
<tr>
<td>CH 232</td>
<td>General Chemistry</td>
<td>Chemistry</td>
</tr>
<tr>
<td>MTH 252</td>
<td>Integral Calculus</td>
<td>Mathematics and Advanced Engineering Mathematics</td>
</tr>
<tr>
<td>CS 161</td>
<td>Introduction to Computer Science I</td>
<td>Instrumentation and Data Acquisition</td>
</tr>
<tr>
<td>MTH 254</td>
<td>Vector Calculus I</td>
<td>Mathematics and Advanced Engineering Mathematics</td>
</tr>
<tr>
<td>MTH 256</td>
<td>Applied Differential Equations</td>
<td>Mathematics and Advanced Engineering Mathematics</td>
</tr>
<tr>
<td>PH 211</td>
<td>General Physics with Calculus</td>
<td>Dynamics</td>
</tr>
<tr>
<td>ENGR 201</td>
<td>Electrical Fundamentals I</td>
<td>Electricity, Power, and Magnetism; Instrumentation and Data Acquisition</td>
</tr>
<tr>
<td>ENGR 211</td>
<td>Statics</td>
<td>Probability and Statistics</td>
</tr>
<tr>
<td>MTH 306</td>
<td>Matrix and Power Series Methods</td>
<td>Mathematics and Advanced Engineering Mathematics</td>
</tr>
<tr>
<td>PH 212</td>
<td>General Physics with Calculus</td>
<td>Dynamics</td>
</tr>
<tr>
<td>ENGR 212</td>
<td>Dynamics</td>
<td>Dynamics</td>
</tr>
<tr>
<td>ENGR 202</td>
<td>Electrical Fundamentals II</td>
<td>Electricity, Power, and Magnetism; Instrumentation and Data Acquisition</td>
</tr>
<tr>
<td>ST 314</td>
<td>Introduction to Statistics for Engineers</td>
<td>Probability and Statistics</td>
</tr>
<tr>
<td>PH 213</td>
<td>General Physics with Calculus</td>
<td>Electricity, Power, and Magnetism</td>
</tr>
<tr>
<td>ENGR 203</td>
<td>Electrical Fundamentals III</td>
<td>Electricity, Power, and Magnetism</td>
</tr>
<tr>
<td>ME 311</td>
<td>Introduction to Thermal - Fluid Sciences</td>
<td>Fluid Mechanics and Dynamics of Gases, Heat, Mass, and Energy Transfer</td>
</tr>
<tr>
<td>IE 415</td>
<td>Simulation and Decision Support Systems</td>
<td>Probability and Statistics</td>
</tr>
<tr>
<td>ESC 340</td>
<td>Introduction to Experimentation</td>
<td>Instrumentation and Data Acquisition</td>
</tr>
<tr>
<td>ESC 350</td>
<td>Engineering Materials</td>
<td>Materials Science; Strength of Materials</td>
</tr>
<tr>
<td>ESC 497</td>
<td>ESC Capstone Design</td>
<td>Ethics and Professional Practice</td>
</tr>
<tr>
<td>ME 331</td>
<td>Introductory Fluid Mechanics</td>
<td>Fluid Mechanics and Dynamics of Liquids</td>
</tr>
<tr>
<td>ESC 440</td>
<td>Computational Methods for Engineers</td>
<td>Mathematics and Advanced Engineering Mathematics</td>
</tr>
<tr>
<td>ENGR 390</td>
<td>Engineering Economy</td>
<td>Engineering Economics</td>
</tr>
</tbody>
</table>

5. Outcomes and Quality Assessment

a. Expected learning outcomes of the program.

The Engineering Science Program will use the ABET student learning outcomes to assess the program. Additionally, educational outcomes that provide extended assessment of the program after graduation have been developed. The Engineering Science Program educational outcomes would align with those of other programs within the OSU College of
Engineering. Within three years of graduation engineering science students will have:

1. obtained professional employment within a field closely related to engineering or entered graduate school for an engineering related field or a professional program such as medical or law
2. created value by applying engineering fundamentals and strong problem solving skills to improve economic, environmental, social and cultural progress
3. embarked on a pursuit of lifelong learning
4. effectively and efficiently communicate ideas to a diverse audience
5. achieved Engineer in Training (EIT) certification by passing the Fundamentals of Engineering exam and gained experience required for professional licensure

Each of the Engineering Science Program educational outcomes will be paired with a related ABET defined student outcome. The ABET student outcomes and their program educational outcomes mappings are shown in Table 7.

**Table 7: Program and student outcome mapping**

<table>
<thead>
<tr>
<th>Program Outcome</th>
<th>Related Student Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 5</td>
<td>(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</td>
</tr>
<tr>
<td>1, 2</td>
<td>(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</td>
</tr>
<tr>
<td>2, 3, 4</td>
<td>(3) an ability to communicate effectively with a range of audiences</td>
</tr>
<tr>
<td>1, 2, 3</td>
<td>(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts</td>
</tr>
<tr>
<td>1, 2, 4, 5</td>
<td>(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</td>
</tr>
<tr>
<td>1, 2</td>
<td>(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</td>
</tr>
<tr>
<td>3</td>
<td>(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</td>
</tr>
</tbody>
</table>

b. Methods by which the learning outcomes will be assessed and used to improve curriculum and instruction.

The curriculum outlined in Table 1 will be mapped to the student outcomes detailed in Table 7. Each student outcome will be assessed in three different classes. The curriculum was evaluated and student outcomes mapped to appropriate courses, shown in Table 8.

**Table 8: ABET student outcomes mapped to specific courses in the curriculum**
Using the mapping in Table 8, the ABET student outcomes will be assessed using the following methods:

1. Assignments will be designed to assess the learning outcome(s) assigned to that class. Wherever possible the type of assignment will be varied.
2. Samples of the graded assignments will be collected. A minimum of three samples will be collected and they will represent the high, average, and low grade of the assignment.
3. At the end of each term, the data from the collected samples will be analyzed. Data to be analyzed includes average score, standard deviation, minimum, and maximum grade for each assignment.
4. Assignments with low average student scores will be used to identify areas for curriculum and instruction improvement.
5. The results of the assessment will be summarized in an executive summary and discussed by the faculty at the end of the academic year.

First and second year courses in the curriculum will be assessed to establish a baseline, but the majority of the courses assessed will be upper division. The lower division classes selected for the assessment involve group work and/or a laboratory component. So, in addition to the traditional assessment tools of exams and homework, there will be rubrics created for all laboratory assignments and written work to ensure a robust evaluation. The upper division courses selected require the students to employ a large variety of skills to be successful and therefore well demonstrate if progress has been made toward achieving the majority of the student learning outcomes. Similar to the early curriculum courses, these classes allow a wide variety of assessment tools to be employed.

c. Nature and level of research and/or scholarly work expected of program faculty; indicators of success in those areas.

Cutting-edge, externally-sponsored research with an engineering focus is expected of tenure track faculty. Indicators of success include:

1. Secure $250,000/yr in external funding
   i. Support a team of graduate students
ii. Support undergraduate researchers

2. A robust dissemination record
   i. Publication in journals highly regarded by their peers
   ii. Presentations at key conferences

Instructors will be responsible for 80% teaching, 10% maintaining currency, and 10% service.

6. **Program Integration and Collaboration**

a. Closely related programs in this or other Oregon colleges and universities.

   Of the seven public higher education institutions in Oregon, three have engineering programs. Additionally, two private schools in Oregon offer engineering programs. Closely related programs within those programs include:

   1. Oregon Institute of Technology:
      a. Electrical Engineering
      b. Mechanical Engineering
      c. Renewable Energy Engineering
   2. Portland State University:
      a. Electrical Engineering
      b. Mechanical and Materials Engineering
   3. Oregon State University:
      a. Electrical Engineering
      b. Mechanical Engineering
      c. Industrial Engineering
   4. George Fox University
      a. Bachelor of Science in Engineering with four concentrations (civil, computer, electrical, and mechanical)
   5. University of Portland
      a. Electrical Engineering
      b. Mechanical Engineering

b. Ways in which the program complements other similar programs in other Oregon institutions and other related programs at this institution. Proposal should identify the potential for collaboration.

   This would be the only program of this kind in Oregon.

c. If applicable, proposal should state why this program may not be collaborating with existing similar programs.

   N/A

d. Potential impacts on other programs.

   From 2014 to 2015 the number of bachelor’s of science degrees awarded from an engineering program grew by 7.5%. An upward trend that started in 2007. The Bureau of Labor Statistics projects employment of mechanical engineers will grow by 5% from 2014 to
2024 while that of electrical and industrial engineers will hold steady. Anecdotal evidence indicates technology companies are bracing for the ‘silver tsunami’. They indicate a large portion of their workforce is preparing to retire and the supply for replacements is low, especially in engineering. All these facts indicate strong demand for engineers and that an additional engineering program would not negatively impact any of the current programs.

7. **External Review**

The proposed program is not a graduate level program.

References.


*Revised May 2016*
Becca,

After looking at the documents you sent we think that the proposed BS in Engineering Science does not compete with our BS in Electrical Engineering. We also consider that does not compete with our BS in Renewable Energy Engineering if the electives are not focused on renewable energy technologies.

Good luck with the launching of your program.

Regards,
Claudia
attachment to be able to take a look to your curriculum and we’ll get back to you soon afterwards.

Regards,
Claudia

Claudia Torres Garibay, Ph.D.
Associate Professor and Department Chair
Electrical Engineering and Renewable Energy Department

Oregon Institute of Technology
27500 SW Parkway Ave., Wilsonville, OR 97070
claudia.torresgaribay@oit.edu | 503-821-1248

www.oit.edu

From: webmaster@oit.edu [mailto:webmaster@oit.edu]
Sent: Friday, October 6, 2017 1:51 PM
To: Claudia TorresGaribay <Claudia.TorresGaribay@oit.edu>
Subject: OSU-Cascades Engineering Science Program (proposed) (Submitted via Website)

From: Rebecca Webb(rebecca.webb@osucascades.edu)

Message:
Dr. Torres-Garibay: My name is Rebecca Webb and I am the Program Lead for the Energy Systems Engineering program at OSU-Cascades. FYI, since starting at OSU I have met many of your graduates. They always have wonderful things to say about the EERE program. Sometimes it seems like we only hear negative feedback, so I thought this might be nice to hear. I’m sure you are very busy now that the term has started, but I have a quick question for you. OSU-Cascades is proposing a new 4-year B.S. degree program in Engineering Science. We are hopeful that it complements rather than competes with the other engineering programs in the state and fills an unmet need. I’d like to hear your opinion. Would you have time to take a quick look at our proposed curriculum and provide your thoughts? Thanks, Rebecca

Referring Page: http://www.oit.edu/academics/engineering-technology-management/eere/faculty
Hi Becca,

I think this looks good and like an interesting program. I have a few questions for you. Have you talked to any local industry about their thoughts on the program? Are there any employers in Bend, Central Oregon, or Oregon that say they would like to employ students coming out of this kind of program? Will GE 101 count for your ESC 101? I think it is important for students to be able to transfer as many credits from COCC as possible to OSU-C and as seamlessly as possible if they want to take their first two years at COCC.

Thanks,

Kevin

From: Webb, Rebecca [mailto:rebecca.webb@osucascades.edu]
Sent: Monday, October 9, 2017 1:33 PM
To: Kevin Grove <kgrove@cocc.edu>
Subject: RE: Engineering Science at OSU-Cascades

Hi, Kevin:
Thanks for your help. The curriculum and executive summary are attached.
Becca

From: Kevin Grove [mailto:kgrove@cocc.edu]
Sent: Monday, October 9, 2017 8:39 AM
To: Webb, Rebecca <rebecca.webb@osucascades.edu>
Subject: RE: Engineering Science at OSU-Cascades

Hi Becca,
Off to a good start hear and I hope things are going well for you, too. That sounds interesting. I don’t know anything about an Engineering Science degree but will look into it. It looks like Vanderbilt has a program. I think in general more options for engineering students in Bend is a good thing. I would be happy to take a quick look at the curriculum and give you my thoughts.

Thanks,
Kevin

From: Webb, Rebecca [mailto:rebecca.webb@osucascades.edu]
Sent: Friday, October 6, 2017 1:36 PM
To: Kevin Grove <kgrove@cocc.edu>
Subject: Engineering Science at OSU-Cascades
Hi, Kevin:
I hope your fall term is going well. Quick question for you. OSU-Cascades is proposing a new 4-year B.S. degree program in Engineering Science. The first two years of the program are very similar to that of the ESE program, so I think that the new program would help populate COCC’s engineering offerings as well as provide a second, local, 4-year engineering degree opportunity for your students. I’d like to hear your opinion. Would you have time to take a quick look at our proposed curriculum and provide your thoughts?
Thanks,
Becca
Rebecca,

I looked over the program in Engineering Science. It does not appear to compete with either of the programs offered by my department in Electrical Engineering or Computer Engineering. I don’t have enough information to make any judgement about whether it would serve an unmet need or not. Please let me know if you need any other information from us. Good luck with your new program.

Regards,
James

On Oct 10, 2017, at 8:54 AM, Webb, Rebecca <rebecca.webb@osucascades.edu> wrote:

Hi, James:
The proposed curriculum and associated executive summary are attached. If you have any question, please let me know. Thank you for your time, I appreciate it.
Becca

Rebecca Webb, PhD | Program Lead & Instructor
Energy Systems Engineering
541.322.3167 | rebecca.webb@osucascades.edu
osucascades.edu

I too would like to have a look at the proposed curriculum.

James

On Oct 6, 2017, at 2:49 PM, Sung Yi <syi@pdx.edu> wrote:

Dear Dr. Rebecca,

It is good to know that OSU-Cascades is proposing a 4-year B.S.
degree program in engineering science.

I will be happy to review the program. However, we have been busy for preparing the ABET visit next week. So it will take some time to provide my opinion.

Thank you.

Sung Yi
Professor and Chair
Mechanical and Materials Engineering Department
Portland State University
Post Box 751
Portland, Oregon 97207-0751
Fax: (503) 725-8255
Phone: (503) 725-5470
Email: syi@pdx.edu
Website: http://web.cecs.pdx.edu/~sungyi/

From: Webb, Rebecca [mailto:rebecca.webb@osucascades.edu]
Sent: Friday, October 06, 2017 1:43 PM
To: syi@pdx.edu; mcnames@pdx.edu
Subject: OSU-Cascades Engineering Science

Drs. Yi and McNames:

My name is Rebecca Webb and I am the Program Lead for the Energy Systems Engineering program at OSU-Cascades. I’m sure you are very busy now that the term has started, but I have a quick question for you. OSU-Cascades is proposing a new 4-year B.S. degree program in Engineering Science. We are hopeful that it complements rather than competes with the other engineering programs in the state and fills an unmet need. I’d like to hear your opinion. Would you have time to take a quick look at our proposed curriculum and provide your thoughts?

Thanks,
Rebecca

Rebecca Webb, PhD
Program Lead | Instructor | Energy Systems Engineering
541.322.3167 | osucascades.edu

James McNames, Ph.D.
James McNames, Ph.D.
Professor and Chair

Electrical and Computer Engineering Department
Maseeh College of Engineering and Computer Science
Portland State University
Rebecca,

I agreed with Prof. McNames. I do not feel much overlap. However, if you still want me to review your program, then I will be happy to do so.

Sung Yi
Professor and Chair
Mechanical and Materials Engineering Department
Portland State University
Post Box 751
Portland, Oregon 97207-0751
Fax: (503) 725-8255
Phone: (503) 725-5470
Email: syi@pdx.edu
Website: http://web.cecs.pdx.edu/~sungyi/

From: James McNames [mailto:mcnames@pdx.edu]
Sent: Monday, October 16, 2017 4:48 PM
To: Webb, Rebecca
Cc: Sung Yi; James Hook; ren su; Bob Bass; Donald Duncan; Branimir Pejcinovic
Subject: Re: OSU-Cascades Engineering Science

Rebecca,

I looked over the program in Engineering Science. It does not appear to compete with either of the programs offered by my department in Electrical Engineering or Computer Engineering. I don’t have enough information to make any judgement about whether it would serve an unmet need or not. Please let me know if you need any other information from us. Good luck with your new program.

Regards,

James

On Oct 10, 2017, at 8:54 AM, Webb, Rebecca <rebecca.webb@osucascades.edu> wrote:

Hi, James:
The proposed curriculum and associated executive summary are attached. If you have any question, please let me know. Thank you for your time, I appreciate it.
Becca
I too would like to have a look at the proposed curriculum.

James

---

On Oct 6, 2017, at 2:49 PM, Sung Yi <syi@pdx.edu> wrote:

Dear Dr. Rebecca,

It is good to know that OSU-Cascades is proposing a 4-year B.S. degree program in engineering science.

I will be happy to review the program. However, we have been busy for preparing the ABET visit next week. So it will take some time to provide my opinion.

Thank you.

Sung Yi
Professor and Chair
Mechanical and Materials Engineering Department
Portland State University
Post Box 751
Portland, Oregon 97207-0751
Fax: (503) 725-8255
Phone: (503) 725-5470
Email: syi@pdx.edu
Website: http://web.cecs.pdx.edu/~sungyi/

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Drs. Yi and McNames:

My name is Rebecca Webb and I am the Program Lead for the Energy
Systems Engineering program at OSU-Cascades. I’m sure you are very busy now that the term has started, but I have a quick question for you. OSU-Cascades is proposing a new 4-year B.S. degree program in Engineering Science. We are hopeful that it complements rather than competes with the other engineering programs in the state and fills an unmet need. I’d like to hear your opinion. Would you have time to take a quick look at our proposed curriculum and provide your thoughts?

Thanks,
Rebecca

<image001.jpg>  
Rebecca Webb, PhD  
Program Lead | Instructor | Energy Systems Engineering  
541.322.3167 | osucascades.edu

<image001.gif>  
James McNames, Ph.D.  
Professor and Chair  

Electrical and Computer Engineering Department  
Maseeh College of Engineering and Computer Science  
Portland State University

<ENGR_SCI_Curriculum.pdf><ENGR_SCI_ExecutiveSummary.pdf>

James McNames, Ph.D.  
Professor and Chair  

Electrical and Computer Engineering Department  
Maseeh College of Engineering and Computer Science  
Portland State University
March 5, 2018

Higher Education Coordinating Commission
255 Capitol Street NE, Third Floor
Salem, OR 97310

Re: Proposed Engineering Science Program, Oregon State University

Dear Commission Members:

I strongly support the proposed Bachelor of Science in Engineering Science degree program at Oregon State University – Cascades (OSU Cascades). I serve in the capacity of CEO and CTO at Element 1 Corp. in Bend (development and licensing of hydrogen technology in support of clean energy commercialization). Although we are based in Central Oregon, we conduct business globally. Presently, we have a technical team of 8 well-educated and experienced individuals, including one graduate of the Energy Systems Engineering program at OSU Cascades.

I have reviewed the proposed Engineering Science curriculum, and believe this program would well prepare students for work as engineers. When filling an open position at my company, we definitely prefer to hire from Oregon Universities, and would certainly look to graduates of the Engineering Science program because we are very satisfied with the quality education provided by OSU Cascades.

Sincerely,

[Signature]

Dave Edlund
Founder & CEO
www.e1na.com
March 21, 2018

Higher Education Coordinating Commission
255 Capitol Street NE, Third Floor
Salem, OR 97310

Re: Proposed Engineering Science Program
    Oregon State University

Dear Commission Members:

I strongly support the proposed Bachelor of Science in Engineering Science degree program at Oregon State University – Cascades. I am a Civil Engineering Project Manager located in Central Oregon. My employer is a private consulting firm that locally employs seven engineers and two EITs with backgrounds in civil and environmental engineering. Additionally, I am the President of the Central Oregon Chapter of Professional Engineers of Oregon. Our organization, part of the National Society of Professional Engineers, represents licensed engineers, advocating for the preservation and strengthening of the professional and ethical standards of the profession.

I have reviewed the proposed engineering science curriculum. I believe this program would provide a strong foundation within several engineering disciplines. The Professional Engineers of Oregon always support the advancement and education of people in the field of engineering. I am pleased to see this program’s intent is to provide a broadly-applicable engineering education. Appropriately, the approval of Accreditation Board for Engineering and Technology, Inc. (ABET) and National Council of Examiners for Engineering and Surveying (NCEES) is being sought for the program by OSU-Cascades.

Sincerely,

Tom Headley, PE, CWRE, LEED AP
Civil Engineering Project Manager
Bend, OR
March 26, 2018

Higher Education Coordinating Commission
255 Capitol Street NE, Third Floor
Salem, OR 97310

Re: Proposed Engineering Science Program
Oregon State University

Dear Commission Members:

I strongly support the proposed Bachelor of Science in Engineering Science degree program at Oregon State University – Cascades. I am a Senior Electrical Engineer at Dana Engineering, Inc. Dana Engineering is located in Richland, Washington, and employs multiple disciplines in Civil, Structural, Mechanical and Electrical Engineering.

I have reviewed the proposed engineering science curriculum. I believe this program would well prepare students for work as engineers because I took similar courses in my Electrical & Electronic Engineering classes at Cal Poly, Pomona. When filling an open position at my company, I would definitely encourage hiring a graduate of the Engineering Science program because it appears that they have a more rounded education than a strictly discipline focused program.

I have included a copy of my resume to show how I experienced many different types of projects in my engineering career.

Sincerely,

William G. Guy, P.E.
ACCESSIBILITY
New Program Proposal
(Degree or Certificate)
Guidelines for Addressing Accessibility

Sections 503 and 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990 (ADA), as amended by the ADA Amendments Act of 2008 prohibits discrimination on the basis of disability. The Rehabilitation Act and the ADA require that no qualified person shall, solely by reason of disability, be denied access to, participation in, or the benefits of, any program or activity operated by the University. Each qualified person shall receive the reasonable accommodations needed to ensure equal access to employment, educational opportunities, programs, and activities in the most integrated setting feasible.

For questions and assistance with addressing access, please contact:
the Office of Disability and Access Services (737-4098), or
the Office of Affirmative Action and Equal Opportunity (737-3556).

Title of Proposal: OSU-Cascades Bachelor of Science in Engineering Science

Date: 01/2019

School/Department/Program: n/a

College: College of Engineering

☐ Accessibility (http://oregonstate.edu/accessibility/policies)
☐ Faculty Guidelines (http://ds.oregonstate.edu/facultyguidelines)
☐ Information Technology Guidelines (http://oregonstate.edu/accessibility/ITpolicy)

By signing this form, we affirm that at we have reviewed the listed documents and will apply a good faith effort to ensure accessibility in curricular design, delivery, and supporting information.

[Signature]
Sign (Dean of Academic Affairs, OSU-C)

Julie Gess-Newsome
Print (Dean of Academic Affairs, OSU-C) 1/14/19

Date

Source: Office of Academic Programs, Assessment, and Accreditation (glb/ch; 4-28-18)
Library Support for the Proposed Engineering Science Program on Cascades Campus

This report is an analysis of the capacity of the OSU Cascades local library collection and services, in combination with access to the resources of the whole of OSU Libraries and Press (OSULP) and Summit, to support the proposed Engineering Science degree on the Cascades campus.

Print Monographs and E-Books
Due to the size restrictions of the OSU Cascades Library, support for this program will depend on the OSU Valley Library in Corvallis and OSULP e-book collections. The print collection at the Valley Library is available to OSU Cascades students by request and can be received within 3 working days. While the print collection is only half the size of the Pennsylvania State University, the peer institution identified by the proposal, the availability of the Orbis Cascade Alliance collections brings the print collection up to a satisfactory level.

OSU is served well by the OSULP investment in the Orbis/Cascades Alliance, whose combined collection is substantial. Students and faculty can order from the collections of all the libraries in the Orbis Cascade Alliance through the Summit catalog. University of Oregon, Portland State University, University of Washington and Washington State University are some of the larger research libraries represented in the Summit catalog. Books requested through Summit are delivered to OSULP within three to five working days.

The growing availability of e-books makes it possible to expedite access to more information from various locations. This immediate access serves the OSU Cascades students and faculty well. Students at the OSU Cascades campus will have access to the e-books purchased centrally, which includes over 7,824 titles in relevant engineering subjects, in a collection of almost 400,000 titles. These include IEEE/Wiley e-books, the ASME Digital Collection, Springer engineering e-books, and the Morgan & Claypool Synthesis Collection.

The ASM Handbook is important to the proposed program, but is currently only available as a print title in the Valley Library. This title is not conducive to borrowing, so the online version of this handbook will be necessary for the proposed program. The online version costs $1,850 per year. The current subscription for the print volumes ($575/year) can be applied to the online subscription, so OSU Cascades will be responsible for the additional cost ($1,275/year) to make the handbooks available to Cascades students.

Serials/Journals
The OSULP maintain a strong journals collection in Engineering. Relevant journals in the Web of Science categories of Multidisciplinary Engineering, Electronic and Electrical Engineering, Mechanical Engineering, Industrial Engineering, and Energy Systems were compared to OSULP subscriptions (See Table 1). Both the full list of journals and the highest impact journals (1st Quartile) were evaluated. Of the high-impact titles, OSULP has access to 94% of the titles. All of these subscriptions are for electronic access to the articles, so OSU Cascades students have immediate access to the content. There is concern that with regular price increases to our licenses
and a flat budget that access may be eroded over time. The OSULP already have sacrificed timely access to some titles in favor of an embargo period to cut costs.

**Table 1. Engineering Science Journals**

<table>
<thead>
<tr>
<th>Subject Category</th>
<th>OSU Holdings</th>
<th>Total # of Journals</th>
<th>% of All Journals</th>
<th>High Impact Factor OSU Holdings</th>
<th>All High Impact Factor Journals</th>
<th>% of High Impact Factor Journals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering, Multidisciplinary</td>
<td>54</td>
<td>85</td>
<td>64%</td>
<td>20</td>
<td>21</td>
<td>94%</td>
</tr>
<tr>
<td>Engineering, Electrical &amp; Electronic</td>
<td>211</td>
<td>262</td>
<td>81%</td>
<td>65</td>
<td>66</td>
<td>99%</td>
</tr>
<tr>
<td>Engineering, Industrial</td>
<td>36</td>
<td>44</td>
<td>82%</td>
<td>11</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td>Engineering, Mechanical</td>
<td>81</td>
<td>130</td>
<td>62%</td>
<td>28</td>
<td>33</td>
<td>85%</td>
</tr>
<tr>
<td>Energy Systems</td>
<td>67</td>
<td>90</td>
<td>74%</td>
<td>22</td>
<td>23</td>
<td>98%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>427</strong></td>
<td><strong>585</strong></td>
<td><strong>73%</strong></td>
<td><strong>138</strong></td>
<td><strong>146</strong></td>
<td><strong>94%</strong></td>
</tr>
</tbody>
</table>

**Indexes and Databases**

The core indexes to the relevant information for this program are shown in Table 2. The OSULP maintain access to these databases as they are core to a number of OSU’s primary research and teaching areas.

**Table 2: Indexes and Databases for Engineering Science**

<table>
<thead>
<tr>
<th>Databases</th>
<th>Publisher</th>
<th>Index Coverage</th>
<th>Full Text Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compendex</td>
<td>Elsevier</td>
<td>1969-Present</td>
<td>Index Only</td>
</tr>
<tr>
<td>Web of Science</td>
<td>Clarivate Analytics</td>
<td>1965-Present</td>
<td>Index Only</td>
</tr>
<tr>
<td>IEEE Xplore</td>
<td>IEEE</td>
<td>1951-Present</td>
<td>Includes journals, conference papers, books, and standards</td>
</tr>
<tr>
<td>ASME Digital Collection</td>
<td>ASME</td>
<td>1960-Present</td>
<td>Includes journals, conference papers, and books</td>
</tr>
<tr>
<td>ASTM Compass</td>
<td>ASTM</td>
<td>Present</td>
<td>Includes journals, research reports, and standards</td>
</tr>
<tr>
<td>SAE Digital Library</td>
<td>SAE</td>
<td>1998-present</td>
<td>Technical papers</td>
</tr>
</tbody>
</table>
Key library services & librarian expertise
Expertise at OSU-Cascades is covered by Sami Kerzei, who provides instruction as requested either in-class or via the web, responds to reference inquiries, and develops materials to assist faculty members and students in their research.

The liaison for the College of Engineering is Lindsay Marlow. Liaisons serve as the major contact for faculty, staff and students, monitor trends in curriculum and research, attend relevant college, departmental and program events to gain insight, and identify how OSULP expertise and resources can be most effectively used. They promote OSULP expertise and collaborate with the Expert Leads to integrate and leverage that expertise throughout the OSU Community.

Providing access to items not owned by OSULP is the domain of the Interlibrary Loan and Summit staff both at OSULP and at lending libraries. Print articles located in the OSU Libraries’ collections may be requested via the Scan and Deliver service, which provides PDFs of the requested articles.

Summary
Overall, OSU Libraries collections are adequate to support the proposed Engineering Science degree at Cascades campus. The addition of a subscription to ASM Handbooks Online is required to support the program. The cost of this would be shared with the Valley Library; Cascades share would be $1,275/year, with an estimated 5%/year inflation.

Respectfully submitted,

Laurel Kristick
Collection Assessment and Science Librarian
October 2, 2017
Christopher L. Hagen, PhD, PE

1500 SW Chandler Avenue, Bend, Oregon 97702  Telephone: 541-322-2061  Email: chris.hagen@oregonstate.edu

Research: Energy systems, advanced internal combustion engines, unconventional fuels, control systems, optical sensors, applied thermodynamics, and fluid mechanics.

Education: PhD, Mechanical Engineering  University of Wisconsin-Madison, 2006
Minor: Control Systems  Madison, WI
Thesis topic: Optical Measurements in Kinetically Controlled Combustion
MS, Mechanical Engineering  Colorado State University, 2002
Emphasis: Energy Conversion  Fort Collins, CO
BS, Mechanical Engineering  Valparaiso University, 1997
Minor: Manufacturing Management  Valparaiso, IN

Experience: Associate Professor  September 2017 – present
Assistant Professor  July 2012 – August 2017
Oregon State University—Cascades  Bend, OR
Founder and director of the OSU Energy Systems Laboratory. Lead a team of ~10 undergraduate, graduate, postdoctoral, and technician researchers investigating clean, novel energy conversion technologies while instructing energy systems engineering (ESE) students in the thermal-fluid sciences.

Assistant Research Professor  March 2010 – July 2012
Colorado State University  Fort Collins, CO
Conducted experiments and educational activities with regard to advanced power generation systems. Pursuits included assessing the operability of unconventional fuels such as hydrotreated biofuels and biomass-derived low energy density gaseous fuels in combustion engines, field-testing feedback control systems for stationary engine emissions control, and developing optical sensors for both fuel quality monitoring and quantification of trace combustion emissions in the troposphere.

Lead Fuels Research Engineer  December 2006 – March 2010
Chevron Energy Technology Company  Richmond, CA
Developed and implemented fuel research programs to evaluate unconventional fuel performance in high-efficiency gasoline and diesel engines. Technical and project manager of global programs with universities, national laboratories, contract laboratories, and industry partners.

Designed and constructed a >$2 million, 1000 SF single-cylinder-engine research facility with advanced emission characterization equipment capable of investigating the combustion performance of both bio- and petroleum-derived fuels.

Graduate Research Assistant  August 2003 – December 2006
University of Wisconsin Engine Research Center  Madison, WI
Developed novel laser-based sensors for collecting chemical kinetic information in harsh environments; specifically, absorption-based microsecond-resolution temperature and species concentrations measurements in n-heptane and isooctane-fueled homogenous charge compression ignition (HCCI) engines.

Application Engineer  February 2001 – August 2003
Woodward Industrial Controls Inc.  Fort Collins, CO
Responsible for fuel delivery system development and analysis. Activities included: fuel system design, fuel flow analysis, component selection, and flow calculations.

Oversaw control system development of 400kW miniturbine generator set located at Walter Aircraft Engines, Prague, Czech Republic.

Onsite control system engineer for 30 MW natural gas-fired turbine generator sets, Pratt & Whitney Power Systems, East Hartford, CT.
Engineer  
Enginuity International Inc.  
December 1998 – December 2000  
Fort Collins, CO

Primary test engineer for final engine set-up of large bore (> 35 cm) natural gas compression engine emissions reduction retrofit projects. Commissioned control systems with lean oxides of nitrogen (NOx) reduction algorithms, high-pressure fuel injection systems, precombustion chambers, high-energy multistrike ignition systems, and upgraded turbochargers.

Graduate Research Assistant  
Colorado State University Engines and Energy Conversion Lab.  
May 1997 – December 1998  
Fort Collins, CO

Project manager on the Global Engines Laboratory online test cell, a web-based educational tool that allows the user to remotely run physical engine experiments. Project scope was three engine stands fueled with gasoline, diesel, and natural gas, respectively.

Co-op Engineer  
Cincinnati Milacron Inc.  
May 1994 – August 1996  
Cincinnati, OH

Assisted senior engineers with fabrication of a high-speed gantry mill for fuselage machining.

TEACHING AND ADVISING:

Courses Taught
- ME 331 Introductory Fluid Mechanics, 2012
- ME 505 Combustion, Reading and Conference, 2014
- ESE 499 Intermediate Thermodynamics, 2017
- MECH 337 (CSU) Thermodynamics, 2012
- MECH 417 (CSU) Control Systems, 2010

Guest Lecturer; MECH 661 (CSU) Int. Comb. Eng.

Research Faculty
- Dr. Yibin Deng (12-month visiting prof., Wuhan U. of Tech., Wuhan, Hubei, China) 2016
- Dr. Kyle Niemeyer, 2015

Post-Doctoral Researchers
- Dr. David Wagner, 2016 – present
- Dr. Shyam Menon, 2014 – 2016 (Asst. Prof. Louisiana State University)
- Dr. Kyle Niemeyer, 2014 (Asst. Prof. Oregon State University)

Advisor, Graduate Students
- PhDME Shane Daly
- PhDME Zachary Taie
- MSME Zoe Lavrich
- MSME Khang Tran
- MSME Sean Brown, 2017 (SpaceX)
- MSME Shane Daly, 2105
- MSME Robert Elgin III, 2014 (Intel)
- MSME Matthew Boley (CSU, 2012)
- PhDME Devin Yates (UC Berkeley Chevron Intern Supervisee, 2008)

Member, Graduate Committee
- MSEE Kyle Hoover
- MSME Matthew Hyder, 2017
- MSME Aaron Fillo, 2017
- MSME Kyle Zada, 2017
- MSEE, David Barry, 2017 (graduate council representative)

- MSEE Alex Louie, 2016 (graduate council representative)
PhDME Thomas Mosier, 2015
PhDME Ida Truedsson (Faculty Opponent, Lund University, Sweden, 2014)
MSME student Roshan Kochuparampil (CSU, 2013)

**Advisor, Undergraduate Honors**
BSME Sean Brown, 2015
BSME Torres Neuhoff (CSU, 2012)

**Advisor, Undergraduate Assistants**
BSESE Jon Young
BSESE Gertrude Villaverde
BSESE Lawandy Agsutinus, 2017
BSESE Claire Cushing, 2017
BSESE Zoe Lavrich, 2016
BSESE Raymond Kuhn, 2016
BSESE Ryan Heltomes, 2016
BSESE Walter Beckwith, 2015
BSESE James Malone, 2015
BSESE Nicholas Olson, 2015
BSESE Zachary Taie, 2014
BSESE Josh Tibbitts, 2014
BSESE Dustin Stewart, 2013
BSESE Megan Glenn, 2013

**Advisor, Visiting Scholar**
BS Physics, Margaret Lane

**Advisor, Senior Design Practicum**
Academic Year (AY) AY 20157, 2014, AY 2013, AY 2011 (CSU), AY 2010 (CSU)

**JOURNAL PUBLICATIONS**


PEER-REVIEWED CONFERENCE PROCEEDINGS


Curriculum Vitae

Christopher L. Hagen

**CONFERENCES PROCEEDINGS, SELECTED PUBLICATIONS, & POSTERS**


**MANUSCRIPTS IN REVIEW OR IN PREPARATION**


2. Brown, S., Cushing, C., Menon, S., **Hagen, C.L.**, Development of a Small Engine Test Stand, *2017 ASME ICEF*. Accepted


**SERVICE TO THE PROFESSION**

- NSF Review Panelist, 2017
- Session Organizer: 2017 Society of Automotive Engineers (SAE) World Congress, Detroit, Michigan, USA, April 4-6, Combustion in Gaseous-Fueled Engines
- Reviewer, Cyclotron Road applications
- Reviewer, NASA ASTAR Graduate Fellowships, 2016
- Session Organizer: 2016 SAE World Congress, Detroit, Michigan, USA, April 12 – 14, Combustion in Gaseous-Fueled Engines
- Reviewer, 2015, *Journal of Applied Thermal Engineering*
- Reviewer, 2015, *Journal of Natural Gas Science & Engineering*
- Executive Committee member, At-Large, Western States Section of Combustion Institute
- Session Organizer: 2015 SAE World Congress, Detroit, Michigan, USA, April 21 – 23, Combustion in Gaseous-Fueled Engines
- Reviewer, 2014, ASME Internal Combustion Engine Division Fall Technical Conference
- Session Organizer: 2014 SAE World Congress, Detroit, Michigan, USA, April 8 – 10, Compressed Natural Gas (CNG)/Dual-fuel CNG Engines
- Session Organizer: 2013 SAE World Congress, Detroit, Michigan, USA, April 16 – 18, Natural Gas Engines and Vehicles
- Reviewer, 2013, SAE International Powertrains, Fuels and Lubricants Meeting
- Reviewer (invited), 2013, Advanced Research Project Agency-Energy, Full Spectrum Optimized Conversion and Utilization of Sunlight (FOCUS) Full Applications
- Session Organizer: 2012 SAE World Congress, Detroit, Michigan, USA, April 24 – 26, Fuel & Additive Effects on SI Engine Performance
- Session Organizer: 2010 SAE International Powertrains, Fuels and Lubricants Meeting, San Diego, California, USA, October 25-27, Alternative Fuels
• Session Organizer: 2009 SAE International Powertrains, Fuels and Lubricants Meeting, San Antonio, Texas, USA, November 2-4, Alternative Fuels
• Session Organizer: 2009 SAE International Powertrains, Fuels and Lubricants Meeting, Florence, Italy, June 15 – 17, Homogenous Charge Compression Ignition (HCCI), Variable Valve Actuation
• Reviewer: 2008 SAE International Powertrains, Fuels and Lubricants Meeting, Session: Alternative Fuels, Homogeneous Charge Compression Ignition Engines
• Reviewer: 2006 SAE World Congress, Session: Combustion and Flow Diagnostics
• Reviewer: 2006 SAE Small Engine Technology Conference
• Reviewer: Optics Communications Journal
• Reviewer: Measurement Science and Technology Journal

INVITED PRESENTATIONS
• Air Force research Laboratory, Reciprocating Engines: UAV Hybrid-Electric Powertrain Development and Modular Chemical Reactor, Dayton, Ohio, USA, July 7, 2017
• Frontiers in Science, Sisters Science Club, Biofuels or Fossil Fuels, Sisters, Oregon, USA, April 26, 2017
• Pacific Crest Middle School, Engineering?, Bend, Oregon, USA, April 21, 2017
• Oak Ridge National Laboratory, Paths toward Natural Gas for Transportation and Residential Power Generation, Knoxville, Tennessee, USA, August 12, 2015.
• Oregon Public Radio Panelist, Think Out Loud: The Impact of the OSU-Cascades Campus, Bend, Oregon, USA, July 10, 2015.
• Lund University, Sweden, Natural Gas for Transportation: Creating a Self Refueling Vehicle, Lund, Sweden, April 24, 2014.
• Professional Engineers of Oregon, Annual Meeting, Energy Conversion Research with an Eye towards Internal Combustion Engines and Natural Gas, Wilsonville, Oregon, USA, May 9, 2014.
• Oregon State University, Science Pub: Natural Gas for Transportation, Corvallis, Oregon, USA, April 14, 2014.
• Portland State University, Mechanical and Materials Engineering Department, Energy Conversion with an Eye towards Internal Combustion Engines and Natural Gas, Portland, Oregon, USA, November 8, 2013.
• Professional Engineers of Oregon, Central Chapter Meeting, Natural Gas Vehicle Research at OSU-Cascades, Bend, Oregon, USA, April 22, 2013.
• Oregon State University, Science Pub: Energy Research, What About Natural Gas for Transportation?, Bend, Oregon, USA, February 19, 2013
• MATHCOUNTS Middle School Students, Engineering?, Redmond, OR February 23, 2013.
• Rotary Club, Mt. Bachelor Chapter, Energy Research, What About Natural Gas for Transportation?, Bend, Oregon, USA, December 14, 2012.
• Bend Research Incorporated, Energy Research Areas: Getting More Out of What We Have, Bend, Oregon, USA, September 13, 2012.

SERVICE TO THE UNIVERSITY
• OSU-Cascades Associate Academic Dean search committee, 2017
• Energy Systems Engineering faculty search committee, 2017
• OSU School of Mechanical, Industrial, and Manufacturing Engineering (MIME) awards committee, 2017, 2016
• MIME Design faculty search committee, 2017
• OSU-Cascades Academic Dean search committee, 2016
• Energy Systems Engineering instructor search committee, 2015
• Graduate Council Representative, 2015, 2014, 2013
• MIME School Head Search Committee, 2013
• MIME Thermal Fluid Science Faculty Search Committee, 2014, 2013
• Technical Advisor for OSU Advantage Accelerator Intern Program (student Sean Brown)

PROPOSALS AWARDED AS PRINCIPAL INVESTIGATOR

• 2017 Sandia National Laboratory Combustion Research Facility, $51,000.
• 2016 Energy System Engineering Graduate Student Fellowship, $51,000.
• 2016 Advanced Research Project Agency for Energy (ARPA-E) Innovative Development in Energy-Related Applied Science (IDEAS), Sponsor: U.S. Department of Energy, Award Number DE-AR0000681, $3,200,000 (Hagen share $600,000)
• 2015 M.J. Murdock Charitable Trust Commercialization Initiation Award, $60,000.
• 2015 Gap Grant, Sponsor: OSU Venture Development Fund, $60,000.
• 2015 NASA Graduate Aeronautics Scholarship, Advanced STEM Training and Research (ASTAR) Fellowship Program (student Sean Brown), $100,000.
• 2014 Gap Grant, Sponsor: Oregon Nanoscience and Microtechnologies Institute (ONAMI), $250,000.
• 2014 Gap Grant, Sponsor: Oregon Built Environment & Sustainable Technologies (BEST), $150,000.
• 2013 Gap Grant, Sponsor: OSU Venture Development Fund, $25,000.
• 2013 Gap Grant, Sponsor: OSU Venture Development Fund, $12,000.
• 2011 University Design Challenge, Sponsor: Air Force Office of Scientific Research, $60,000.
• 2010 Physics-Based Dynamic Model of Marine Based Power Generation Equipment, Sponsor: Woodward Inc., $71,000.
• 2009 Strategic Research proposal, topic confidential, Sponsor: Chevron Energy Technology Corporation, $170,000 per annum.
• 2009 Strategic Research proposal, topic confidential, Sponsor: Chevron Energy Technology Corporation, $80,000 per annum.
• 2004 Graduate Student author of “Dual-clad fiber optics for single-port absorption spectroscopy sensor,” Sponsor: The Optoelectronics Industry Development Association through the Photonics Technology Access Program (PTAP), $33,000.

PATENTS

PROFESSIONAL AWARDS, MEMBERSHIPS AND CERTIFICATIONS

SAE Ralph R. Teetor Faculty Award, 2017
OSU Faculty Innovator Award, 2016
OSU Excellence in Postdoctoral Mentoring Award, 2016
OSU-Cascades Scholarship & Creative Activity Award, 2015
Member, Society of Automotive Engineers (SAE)
Member, The Combustion Institute
Member, American Society of Mechanical Engineering (ASME)
Member, Institute for Electrical and Electronics Engineers (IEEE)
Professional Engineer, State of Colorado
Scholarship, Association of Energy Engineers (AEE), 1998

ENTREPRENEURSHIP

Founder and former CTO, Onboard Dynamics Incorporated, Bend, Oregon, Oct. 2013 – March 2015
CTO, Crystal Creek Energy, LLC, Fort Collins, Colorado, 2011-2012
Bahman Abbasi

Email: AbbasiB@oregonstate.edu
Phone: 541-706-2093
Website: http://mime.oregonstate.edu/people/abbasi

Biographical Summary

Dr. Bahman Abbasi joined Oregon State University in 2017 as an Assistant Professor of Mechanical, Industrial, and Manufacturing Engineering (Energy Systems Engineering). Before joining OSU he worked as a Lead Technologist at Booz Allen Hamilton and a Technical Advisor to US Department of Energy with wide-ranging experience in power generation systems, solar-thermal energy, high-temperature materials, light metals production and recycling, water-energy nexus, among other energy technologies. Prior to that he worked in various industries; including, natural gas pipes manufacturing, automotive, as well as a Lead Engineer at General Electric. He received his Ph.D. in Mechanical Engineering from the University of Maryland in 2010 with focus on phase-change phenomena and heat transfer, and has authored 20 technical publications including five issued patents.

Education

- **Ph.D. in Mechanical Engineering**, University of Maryland, College Park, MD (2008-2010)
  - Focus area: Multiphase flows, phase change phenomena
  - Dissertation title: “Pressure-based prediction of spray cooling heat transfer and critical heat flux”
  - Investigated the effect of spray characteristics on spray cooling heat transfer and developed a comprehensive pressure-based correlation to predict the single- and two-phase heat transfer coefficient and critical heat flux.

- **M.S. in Mechanical Engineering**, Southern Illinois University, Edwardsville, IL (2006-2007)
  - Focus area: Fluid mechanics, free surface flows
  - Thesis title: “Experimental and computational study of droplet and bubble formation”
  - Conducted high-speed photography and 3D numerical analysis to study droplet and bubble formation, growth, and detachment as a function of fluid properties and temperature.

- **M.S. in Automotive Engineering**, 2004-2006
  - Focus area: Internal combustion engines, reacting flows
  - Developed KIVA- and Fluent-based codes to study fuel droplet deformation, evaporation, and combustion in a compression ignition engine.

- **B.S. in Mechanical Engineering**, 2000-2004
  - Focus area: Mechanical design, solid mechanics
Research Interests

- Energy-efficient and cost-effective water desalination/purification/reclamation systems for decentralized production using local surface or underground resources.
- Devise solutions to address reverse osmosis (RO) desalination systems’ major hindrances (namely, tremendous capital and operating costs) by scaling down systems while maintaining efficiency.
- Fabricate alternative and more effective membranes and novel control systems as well as design hybrid and entirely new processes; integrate these with renewable energy sources.
- Conduct interdisciplinary research into ultra-high temperature materials and coatings (> 1500 °C) in oxidizing environments for various applications such as, hydrogen generation, solar fuels production, and thermal energy storage.
- Develop novel fabrication technologies for specialty materials and applications.

Previous Professional Experience

  - Contribute to identifying energy-related areas for conducting research and technology development projects and develop Funding Opportunity Announcements in those areas.
  - Benchmark technical state of the art and designated areas with transformational impact on domestic and global energy outlook.
  - Design technical and economic metrics to assure success in research project management of assigned program areas. Examples include light metals production (ARPA-E METALS program) and dispatchable solar electricity generation (ARPA-E FOCUS program).
  - Review numerous research proposals on a wide variety of topics to evaluate scientific and engineering soundness, economic viability, scale-up potential, and impact on US and global energy production and consumption.
  - Advise and support U.S. government officials in selecting, negotiating, and actively overseeing and managing dozens of multimillion dollar technology development projects in a variety of energy production, storage, and consumption subjects. Examples areas include:
    - Thermal storage technologies using molten salts, molten metals, or solid particles.
    - Solar fuel production in different cycles using ceria or perovskites as reactive material.
    - Combined solar electricity and storage systems in various configurations of dish, CPV, heat storage, and thermo-acoustic engines for power generation.
    - Super-critical CO₂ power cycle including rotor design and cold storage.
    - Light metals extraction from ore using various leaching, carbothermic, and electrochemical processes.
    - Light metals recycling with electromagnetic, XRF, or electrochemical methods.
    - Day- and night-time radiative cooling using photonic structures.

- **Lead Advanced Systems Engineer**, General Electric Appliances, Louisville, KY (2011-2013)
  - Designed, developed, and evaluated a model-based hybrid PID/optimal control system for household refrigerators to enhance thermal and humidity control as well as energy efficiency. Field testing completed over two years of operation without failure.
- Developed and experimentally verified a novel method for computer simulation of two-phase flows in capillary tubes in the absence of precise geometric information.
- Participated in the development of a prototype food identification system for household refrigerators using various image processing techniques.
- Led the design, development, and fabrication of a state of the art research laboratory, equipped with various thermal-fluid measurement instruments as well as an advanced LabVIEW data acquisition system.
- Obtained five U.S. patents and published a number of technical papers on various control strategies for household refrigerators and object identification methods.

Publications

Journal Articles and Patents


Conference Papers


**Other Qualifications and Experiences**

**Industrial Experience**
- Worked as a Mechanical Engineer in automotive and manufacturing industries (2002-2006).
- Collaborated with Garneu Industries Ltd. (a Canadian firm) to install and commission a three-layer coating plant for natural gas transmission pipes.
- Conducted detailed studies on the technological requirements and business and environmental impacts of using CNG as transportation fuel in the Middle East.
- Designed parts and components for a variety of application; including, various support structures in manufacturing plants (trusses, catwalks, etc), polyethylene extruder parts, and conveyor belts (for cement production industry).

**Professional Memberships**
- American Society of Mechanical Engineers
- The Minerals, Metals, and Materials Society

**Training and Certificates**
- Booz Allen Hamilton: Several training programs in engineering management and consulting.
- General Electric: Six Sigma and multiple other technical and non-technical training programs.
- MathWorks: Matlab, Simulink, Simscape.
- National Instruments: LabVIEW core courses 1, 2, and 3.
Kyle Webb – Curriculum Vita
Instructor, Energy Systems Engineering
Oregon State University - Cascades
Tykeson Hall 318
1500 SW Chandler Ave
Bend, OR 97702
(541) 322-3134

A. EDUCATION AND EMPLOYMENT INFORMATION

Education:

2013 University of Colorado
   Ph.D. Electrical Engineering

2005 Oregon State University
   M.S. Electrical Engineering

1998 Dartmouth College – Thayer School of Engineering
   B.E. Electrical Engineering

1997 Dartmouth College
   A.B. Engineering

Employment:

2015 to present Instructor, Energy Systems Engineering
   OSU-Cascades
   Bend, OR

2012-2015 Instructor, Department of Mechanical and Aerospace Engineering
   University of Colorado Colorado Springs
   Colorado Springs, CO

2009-2012 Lecturer, Department of Mechanical and Aerospace Engineering
   University of Colorado Colorado Springs
   Colorado Springs, CO

1999-2009 R&D Engineer
   Agilent Technologies
   Colorado Springs, CO

1998-1999 R&D Engineer
   Hewlett-Packard Company
   Colorado Springs, CO
## B. TEACHING, ADVISING, AND OTHER ASSIGNMENTS

### 1. Instructional Summary

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C. SCHOLARSHIP AND CREATIVE ACTIVITY

1. Publications:


D. SERVICE

1. University Service

**OSU-Cascades**
- Winter 2017  PROT Committee – Matt Orr
- Winter 2017  Search Committee – ESE Assistant/Associate Professor
- 2016 -  Experiential Learning/Undergraduate Research Committee
- 2016 -  Honors College/Baccalaureate Core Committee
- Spring 2016  Search Committee – Mathematics Instructor
- Winter 2016  PROT Committee – Susan McMahon
- 2015 - 2017  Long-Range Development Planning Committee
- 2015 - 2017  LRDP Committee – Sustainability Advisory Group
- Fall 2015  PROT Committee – Todd Montgomery

**UCCS**
- 2014-2015  UCCS Green Action Fund – Faculty Advisor
- 2014-2015  UCCS Sustainability Committee
- Fall 2014  MAE Instructor Search Committee
- Fall 2013  MAE Instructor Search Committee – Chair
- 2012-2014  MAE Course Scheduling Coordinator
- 2012-2014  SAE Baja Club - Advisor
- 2012-2014  MAE Laboratory Committee - Chair

E. AWARDS

- 2014  UCCS Outstanding Instructor Award
- 2014  College of Engineering and Applied Science Teacher of the Year
- 2012  College of Engineering and Applied Science Lecturer of the Year
Rebecca Webb – Curriculum Vita
Instructor, Energy Systems Engineering
Oregon State University - Cascades
Tykeson Hall 316
1500 SW Chandler Ave
Bend, OR 97702
(541) 322-3167

A. EDUCATION AND EMPLOYMENT INFORMATION

Education:
2005    Oregon State University
        Ph.D. Mechanical Engineering

2000    Pennsylvania State University
        M.S. Mechanical Engineering

1998    University of Rhode Island
        B.S. Mechanical Engineering

Employment:
2016 to present  Program Lead and Instructor, Energy Systems Engineering
                 OSU-Cascades
                 Bend, OR

2014-2016  Associate Professor, Department of Mechanical & Aerospace Engineering
           University of Colorado Colorado Springs
           Colorado Springs, CO

2007-2014  Assistant Professor, Department of Mechanical & Aerospace Engineering
           University of Colorado Colorado Springs
           Colorado Springs, CO

2006-2007  Senior Engineer
           Directed Energy Solutions
           Colorado Springs, CO

2000-2002  R&D Engineer
           Agilent Technologies
           Colorado Springs, CO
## B. TEACHING, ADVISING, AND OTHER ASSIGNMENTS

### 1. Instructional Summary

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2. Student Evaluations of Teaching (OSU-C courses only):

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<tr>
<th>Term</th>
<th>Course</th>
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<th>Q1 Dept. Median</th>
<th>Q2 Course Median</th>
<th>Q2 Dept. Median</th>
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<td>26/33</td>
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<td>4.8</td>
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<td>W17</td>
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<td>19/28</td>
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<td>F16</td>
<td>ENGR 211</td>
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<td>F16</td>
<td>ME 311</td>
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<td>6.0</td>
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</tr>
</tbody>
</table>

C. SCHOLARSHIP AND CREATIVE ACTIVITY

1. Publications:


SERVICE

1. University Service

**OSU-Cascades**

- 2016 – Program Lead Committee
- 2016 – ABET data collection and analysis
- 2017 – 2018 Search committee chair – CS Assistant Professor
- 2017 – 2018 Search committee – Associate Dean
- 2017 – 2018 Search committee – Physics Instructor
- 2016 – 2017 Search committee chair – ESE Assistant Professor
- 2016 – 2017 Search committee – Physics Instructor
- 2016 – 2017 Search committee – Computer Science Instructor
- 2016 – 2017 Program Expansion Committee
- 2016 – 2017 Campus Culture Committee
- 2016 – 2017 Purchased all physics equipment and did lab set up for PHY 211, 212, 213

**UCCS**

- 2014 – 2015 Sustainability Committee
- 2014 – 2015 Undergraduate Research Committee
- Fall 2014 MAE Primary Unit Committee, Chair
- 2013 – 2015 MAE Honors Program development
- 2012 – 2015 MAE Executive Committee
- 2012 – 2015 Founder and director of campus-wide Undergraduate Research Academy
- 2012 – 2014 MAE Workload Policy Committee
- 2010 – 2015 Faculty Assembly
- 2010 – 2015 MATLAB License Review Committee
- 2010 – 2011 Society of Women Engineers, Faculty Advisor
- 2009 – 2014 Society of Automotive Engineers Baja Team, Faculty Advisor
- 2008 – 2010 MAE Website Maintenance
- 2007 – 2015 MAE Search Committees
- 2007 – 2014 Faculty Assembly Women’s Committee
- 2007 – 2012 MAE Graduate Committee, Chair
- 2007 – 2012 MOSAIC Mentor
- 2007 – 2009 MAE Lab Committee
### D. AWARDS

<table>
<thead>
<tr>
<th>Year</th>
<th>Award Description</th>
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<tr>
<td>2014</td>
<td>UCCS Million Dollar Club</td>
</tr>
<tr>
<td>2014</td>
<td>UCCS Outstanding Teacher Award</td>
</tr>
<tr>
<td>2012</td>
<td>College of Engineering and Applied Science Researcher of the Year</td>
</tr>
<tr>
<td>2009</td>
<td>College of Engineering and Applied Science Teacher of the Year</td>
</tr>
</tbody>
</table>
3/9/2018

Dr. Rebecca Webb  
Program Lead & Instructor, Energy Systems Engineering  
1500 SW Chandler Avenue  
Oregon State University - Cascades  
Bend, OR 97702

Dear Becca,

Thank you for the opportunity to review the College of Engineering’s proposal to provide a Bachelor of Science in Engineering Science at the Oregon State University-Cascades campus. Per my review of the documentation provided and discussed, I understand that the program has some redundancy will current program offerings but will require additional space to accommodate new faculty and instructional labs that are not currently available.

I am assuming that courses listed in the proposal can be accommodated in the currently available classrooms through growth in seat capacity utilization or increased scheduled room utilization. The application indicates the Engineering Science program will temporarily lease shop space to support any machine shop required course work until construction of the STEAM-focused Academic Building 2 is completed in 2021. Space programming for engineering labs has been identified for the new facility. I would advise a review of space needs occur for this program to ensure the new facilities will meet anticipated growth needs for the program as the OSU-Cascades campus expands.

Given that your proposal outlines an initial strategy for accommodating the program fully through on-campus facilities and off-campus leased facilities, current space needs should not be impacted by the College of Engineering’s request and OSU-Cascades Planning and Design supports this proposal.

Sincerely,

Jane M. Barker
Sr. Project Manager for Campus Expansion
Oregon State University-Cascades
This assessment plan and report template has multiple tabs. Be sure to open your window wide enough to see the tabs.

What this assessment plan and report are asking for:

>>> This report is asking for a clear, succinct accounting of full-cycle assessment activities for each degree program. This means the program needs to engage in and report the following:
   >> Each degree program must have clear, measurable student learning outcomes that represent the knowledge, skills, and values a graduating student will possess.
      > The outcomes need to be meaningful to the faculty and other professionals in the field and represent what OSU students need to succeed and be valued in the field.
      > The outcomes will likely have sub-components that help further define the outcome. If you develop sub-components, those can be submitted as an attachment to the report. For this report you can just list the primary outcome.
   >> Each year one or more of the program outcomes must be in some stage of the assessment cycle (data collection, review/consideration of the data, implementation of changes as a result of the data) such that ALL outcomes have been assessed and reported in a period of 5 years.
      > A plan must be in place to measure all outcomes within 5 years. A plan is built into this annual assessment report under questions 3.c. and 5. Separate, detailed plans are encouraged.
      > A cycle of fewer than 5 years is fine. If the program has fewer than 5 outcomes, it will be on a shorter cycle (e.g. 4 outcomes = 4 or fewer years).
      > If the program has >10 different outcomes and needs a longer cycle, please contact the APAA to develop an alternative plan. We are glad to work with you.
      > If programs are in the developmental phases for program-level assessment and/or have new learning outcomes, start with assessing FEWER outcomes and ASSESS THEM WELL!
      > Please communicate with the APAA if this is the case or if you want some help with designing an efficient assessment plan.
   >> Each outcome must have at least one direct measure identified and aligned to it, but more than one measure is best practice and far more reliable.
      > Indirect measures can be used to support or triangulate the data from the direct measures.
      > In some cases indirect measures are the primary means of data collection. This is the exception rather than the rule. If indirect measures are the sole source of data, then please provide an explanation for its selection.
   >> Use the student learning data to inform programmatic decision-making to maximize student learning and improve the strength, effectiveness, and efficiency of the program.
      > You will be asked to describe the process your unit uses/d to reflect upon the data, how results of assessment efforts relate to strategic planning, and plans for any course, curricular, or unit level changes based upon the data.

Why are we asking for this?

>>> The number one reason we are asking for this information is to ensure the use of evidence and data to inform curricula and pedagogy.
   >> Just as in our scholarly and creative work, evidence and data are essential supplements to the professional competence and commitment that we dedicate to our students.
   >> Additional reasons, which should be compelling to educators and members of the academic community, are that we owe it to the students and we must demonstrate genuine, full cycle assessment to our accrediting body, the NWCCU. Remember, accreditation is voluntary but necessary.

How the annual report submission and the associated tracking and submission process works:

>>> By switching to an Excel spreadsheet format your program can report multiple years of data in one document. Just use a new tab for a new year and label the tab.
>>> Submit reports to the APAA Sharepoint website: https://sharepoint.oregonstate.edu/sites/APAA/assessment/default.aspx
   >> Instructions can be found at: http://oregonstate.edu/admin/aa/apaa/assessment-resources
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**Program Learning Outcomes, Benchmarks and Measures**

<table>
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<tr>
<th>Outcomes</th>
<th>Assessment Method:</th>
<th>Evaluation of materials/archived</th>
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<tbody>
<tr>
<td>1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</td>
<td>Executive Summaries (D), Matrix of Overall Performance on SO’s (D), Surveys of Students, Alums, Employers (I) - the direct assessments come directly from course learning outcomes that map to our student outcomes, and include homeworks, exam questions, quizzes, projects, lab reports, etc.</td>
<td>2019</td>
</tr>
<tr>
<td>2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</td>
<td>Executive Summaries (D), Matrix of Overall Performance on SO’s (D), Surveys of Students, Alums, Employers (I) - the direct assessments come directly from course learning outcomes that map to our student outcomes, and include homeworks, exam questions, quizzes, projects, lab reports, etc.</td>
<td>2019</td>
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<tr>
<td>3. an ability to communicate effectively with a range of audiences</td>
<td>Executive Summaries (D), Matrix of Overall Performance on SO’s (D), Surveys of Students, Alums, Employers (I) - the direct assessments come directly from course learning outcomes that map to our student outcomes, and include homeworks, exam questions, quizzes, projects, lab reports, etc.</td>
<td>2019</td>
</tr>
<tr>
<td>4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts</td>
<td>Executive Summaries (D), Matrix of Overall Performance on SO’s (D), Surveys of Students, Alums, Employers (I) - the direct assessments come directly from course learning outcomes that map to our student outcomes, and include homeworks, exam questions, quizzes, projects, lab reports, etc.</td>
<td>2019</td>
</tr>
<tr>
<td>5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</td>
<td>Executive Summaries (D), Matrix of Overall Performance on SO’s (D), Surveys of Students, Alums, Employers (I) - the direct assessments come directly from course learning outcomes that map to our student outcomes, and include homeworks, exam questions, quizzes, projects, lab reports, etc.</td>
<td>2019</td>
</tr>
<tr>
<td>6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</td>
<td>Executive Summaries (D), Matrix of Overall Performance on SO’s (D), Surveys of Students, Alums, Employers (I) - the direct assessments come directly from course learning outcomes that map to our student outcomes, and include homeworks, exam questions, quizzes, projects, lab reports, etc.</td>
<td>2019</td>
</tr>
<tr>
<td>7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.</td>
<td>Executive Summaries (D), Matrix of Overall Performance on SO’s (D), Surveys of Students, Alums, Employers (I) - the direct assessments come directly from course learning outcomes that map to our student outcomes, and include homeworks, exam questions, quizzes, projects, lab reports, etc.</td>
<td>2019</td>
</tr>
</tbody>
</table>

**Process**

*How will you communicate program level student learning outcomes to the students and the public? (Include web link)*

Our student outcomes and our program educational objectives will be posted on the OSU Cascades website (https://osucascades.edu/academics)

**What data are you archiving? Where and how? How long do you expect to archive the data?**

ABET self-study reports, executive summaries, matrix of overall performance, and student samples of work. All materials archived digitally in Box. Data will be kept for an ABET assessment cycle.
### Program Information

- **Program:** This is the title of your primary degree program/certificate
- **College or Administrative Division:** This is the College or Administrative Division that contains the program
- **Subunit(s):** This is the Department and/or School
- **Report Submitted By:** Type the name and position/role with the unit
- **APAA Submission Cycle Due Date:** 4/15/2018

### Program Outcomes Matched with Measures and Results

#### Outcomes:
List your program level student learning (SLO) outcome(s). *

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
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<tbody>
<tr>
<td>Program level student learning outcome</td>
<td>Program level student learning outcome</td>
<td>Program level student learning outcome</td>
<td>Program level student learning outcome</td>
<td>Program level student learning outcome</td>
</tr>
</tbody>
</table>

#### Results:
What do the data that result from you assessment methods or processes show about student learning relative to this outcome? Describe any patterns or trends that you identified as meaningful or that highlight areas of concern or success.

#### Actions:
Describe any course-level (content, pedagogical, structural, etc.) changes that will result/have resulted from the current year’s assessment of this outcome. Include timelines.

#### Actions:
Describe any program/degree level (e.g., curricular, process, structural, etc.) changes related to this outcome that have resulted/will result from this year’s assessment and/or from other sources (i.e., external accreditors).

#### Full-Cycle impact:
If this learning outcome has been assessed previously and is being reported on again this year, what impact have the changes incorporated (if any) had on student learning? If you have not yet assessed the results of the changes made based on previous results, please indicate the year you will revisit this outcome.

### Process

How did your unit reflect on the data you are reporting and who was involved? Were there any challenges or concerns? How are the results of your assessment efforts related to strategic planning and overall program review?

Are there specific data archiving notes for the outcome(s) you are reporting on in this report?

### Plans

Describe the unit’s (or sub-units) assessment plans for the upcoming year.
Copy and paste the template from the previous year. Doing “select all” does not always work with merged fields, so highlight the rows (arrow to the far left hold down mouse button), copy, click in this upper left cell and paste.
Outcomes and Quality Assessment

Section a.
This section only requires student learning outcomes and not educational outcomes. However, I feel that including the educational outcomes strengthens the proposal. I would suggest that you further emphasize the fact that the ABET outcomes are the actual student learning outcomes. Maybe add a few sentences at the beginning of the section that provides an overview of the different types of outcomes. For example:
“The Engineering Science Program will be using the ABET student learning outcomes to academically assess the program. Educational outcomes have also been developed to provide extended assessment of the program beyond students’ time at OSU.”

Section b.
The assessment methods are well described and align with other engineering programs assessment plans. The numbered steps that you have provided create a great view for the program’s process of assessment. While I do have some suggested additions, please retain the current description as the core of your response.

I believe the response could be improved with 2 additions: identifying specific courses where assessment will take place and providing some examples of possible assessment instruments.

The identification of courses could be done in a visual format like a curriculum map (similar to Tables 1, 2, and 5). This map can be tentative, with a possibility that it might change in the future. However, at this stage in the proposal, it is expected that a program has some idea about “where” assessment will take place.

Providing descriptions of possible assessment methods will provide the reviewers with context for how students will be evaluated. Examples of possible methods would not need to be provided for every outcome, only a few are needed to demonstrate the types of assessments that you are planning on using. For example, you could add a few sentences that say, “To assess outcome (d), a rubric will be created to assess students during a specific group project in ESC 350. The results of a research paper in ESE 497 will be used to assess outcome (h).”
1) Do supplies and equipment costs match need—seem low to potential needs. Are you using course fees to offset some of these costs? Are you using existing equipment from other programs disciplines?

We will be using equipment from the Energy Systems Engineering program for classes in the first two years of the curriculum. Minor equipment needed for upper division courses are shown in the year 1 and 2 budgets under “services and supplies.” Other major equipment purchases (Instron machine and Rockwell hardness tester) are contained in a “fixed furniture and equipment” budget for our new academic building (AB2) and will be purchased at the time of the building construction. The building will be ready in Fall 2021 which is consistent with the needs of the program.

2) Would there be additional marketing/outreach costs? How would updating websites, promotional materials be covered? Or does the larger Cascades budget account for this?

Marketing and outreach costs are part of the larger Cascades budget. The marketing budget includes line items for new programs.

3) Would .33 FTE for the Machine Shop Staff cover the needs of the 19.75 FTE of students that would need access to a Machine Shop? And how? Is the shop open for 13 hours a week, staff by student workers as well, etc. Is it already managed by costs through another program discipline?

Three courses will utilize the machine shop for curricular activities. MIME 101 will use the shop 2-3 times throughout the Fall term. ESE 497 and ESE 498 (Capstone Design) will use the shop intermittently in the Fall and Winter terms respectively. Other uses of the shop include research support for tenured and tenure track faculty. 13 hours per week of shop support will be adequate for these initial tasks. The staff position will also have oversight of maker spaces for our Arts, Media and Technology and Outdoor Products degree programs that will fund the remaining 0.67 FTE for that staff member. The machine shop staff is not a curricular or teaching position. The staff is there for operational concerns of the equipment in the shop and to make sure supplies are ordered and on hand. The curricular needs in the machine shop are handled by course instructors.

4) Please move the student worker out of the supplies and services section and allocate them in personnel. You may have already identified the OPE with them, but that should also be identified in there.

Done.
Janice,

Can you attach this email string to CPS #102102 and let me know once you’ve attached it?

Thanks!
Michele

Good morning Rebecca, Candice,

I hope your holiday weekend was restful.

I’m forwarding the response from Dr. Rebecca Webb on the Cat I questions you forwarded for Engineering Sciences (see below and attached). I don’t know if the questions/responses need to be formally documented in the CPS, but we stand ready to do that if necessary.

I appreciate the effort that goes into reviewing these. Please let me know if we can address any other concerns.

Best,
Andrew

- 2 of the 6 courses in the new designator are capstone- it means there are only 4 content based courses in the new description. Might be fine but speaking to that would be useful (read: don’t create new courses to just create new courses, but articulate why the limited new courses in the new designator are complimented with the already existing courses).
I updated the executive summary and full proposal to make sure this is clearly addressed but cannot upload the new documents in CPS (it says this proposal is no longer available for editing). They are attached to this email and summarized below:

- Added to Executive Summary: Due to the multidisciplinary nature of the proposed program, which will be housed in the College of Engineering, the curriculum can be constructed largely from existing engineering classes. The impact and uniqueness of the program is through a thoughtful integration of courses across disciplines rather than the creation of new courses. Therefore only four unique courses are required, allowing for fast implementation.

- Added to full proposal: Due to the multidisciplinary nature of the proposed program, the curriculum was purposefully constructed from existing engineering classes wherever possible. The impact and uniqueness of the program should be through exposure to courses across disciplines. Therefore the content of existing courses was carefully reviewed and those that mapped to the goals of the proposed program adopted. The result was only four unique courses will need to be created.

- There didn’t seem to be outright support from PSU, just no disagreement. Is that sufficient? The purpose of the liaison process is to inform not garner “outright support.” The Provost has asked for and received the brief program description that was presented to the Statewide Provost Council. We have not heard of any objections to this program from PSU or any other state entity.

- Advisor: student ratio is not reasonable (doesn’t mean there is a solution but want to go on the record with this statement)
Our advisor to student ratio at OSU-Cascades is 1:275. That is part of our budget model and has been decided for our campus. Energy Systems and Computer Science currently have on the order of 175 students. There is capacity for advising in our central pool and with our current engineering advisor and more advisors will be hired as the need arises.

- The two capstone courses (497 and 498) have the exact same course description. That doesn’t make sense and should either be one course and repeatable for credit or should be different. The course name MIME Capstone Design might be confusing to folks who don’t know what MIME means. I know there is a character limitation but perhaps it could be a bit more descriptive?
This will not be changed to maintain consistency with all MIME Capstone Design offerings.

- It’s my understanding that course descriptions should be complete sentences that describe what is covered in the courses. I don’t have expertise in this area but can say that a HUGE audience of the course descriptions (after students, of course), is transcript evaluators. Evaluators use the description as the first basis (sometimes the only) to find equivalencies when someone is transferring from one school to another. So, if there isn’t enough information, it’s likely that someone might not get transfer credit OR that it will take a lot of extra work to get transfer credit. So, a possible lens to use is “can someone without extensive knowledge in this topic understand the basic topics that will be covered (and at what level) in this course”? Just my two cents.

All updated in the system.
Hi, Rick:
Thanks for looking at this. Yes, I was modeling after CH 201, 201, 205 – with the hopes that we will soon have the capacity to offer that series as well.
Becca

From: Nafshun, Richard Loren <Richard.Nafshun@oregonstate.edu>
Sent: Friday, April 26, 2019 4:39 PM
Cc: Webb, Rebecca <rebecca.webb@osucascades.edu>
Subject: Re: OSU-Cascades Engineering Science Program (proposed) - requesting input from chemistry

Hi Becca,
Looks good. With two terms of lecture and one term of lab are you modeling this after CH 201, 202, and 205?
Best,
Rick

Dr. Richard L. Nafshun
Department of Chemistry
Oregon State University
Corvallis, Oregon 97331
541.737.6742
nafshunr@chem.orst.edu

On Apr 26, 2019, at 4:25 PM, Lerner, Michael M <Michael.Lerner@oregonstate.edu> wrote:

Hi Becca- I think you might contact Rick Nafshun, he is cc’d.

From: Webb, Rebecca
Sent: Friday, April 26, 2019 3:42 PM
To: Lerner, Michael M
Subject: OSU-Cascades Engineering Science Program (proposed) - requesting input from chemistry

Hi, Michael:
OSU-Cascades has proposed an Engineering Science degree. As part of the curriculum, we have proposed our students to take:

- CH 231
- CH 261
- CH 232

We would like liaison input on the inclusion of these courses from the chemistry
department. Would you mind directing me to the right person for this request?

Thanks,

Becca

Rebecca Webb, PhD | Program Lead & Instructor
Tykeson Faculty Scholar in Energy Systems Engineering
541.322.3167 | rebecca.webb@osucascades.edu
Hi, Bill:

Thanks for looking at this so quickly. Our students do need exposure to Taylor series and polynomial approximation, so our plan was to provide that material in our computational methods class.

I think that is all I need for now. Thanks again for the quick reply.

Becca

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From: Bill Bogley <bogleyw@science.oregonstate.edu>
Sent: Friday, April 26, 2019 4:45 PM
To: Webb, Rebecca <rebecca.webb@osucascades.edu>
Cc: Bill Bogley <bogley@math.oregonstate.edu>
Subject: Re: OSU-Cascades Engineering Science Program (proposed) - requesting input from math

Dear Rebecca,

This is a pretty reasonable spread. Only question I might ask is whether your students will need some exposure to Taylor series or polynomial approximation of functions. That’s MTH 265, of course.

Do you need more than that at this point? The other question you may need to ask is whether the MTH capacity exists at Cascades to deliver these courses for your students.

Let me know how I can help.

Bill

Bill Bogley, Professor and Head
Department of Mathematics
Oregon State University

On Apr 26, 2019, at 3:37 PM, Webb, Rebecca <rebecca.webb@osucascades.edu> wrote:

Hi, Bill:
OSU-Cascades has proposed an Engineering Science degree. As part of the curriculum, we have proposed our students to take:

- MTH 251
- MTH 252
- MTH 254
- MTH 256
- MTH 264

We would like liaison input on the inclusion of these courses from the mathematics department. Would you mind directing me to the right person for this request?

Thanks,

Becca

Rebecca Webb, PhD | Program Lead & Instructor
Tykeson Faculty Scholar in Energy Systems Engineering
541.322.3167 | rebecca.webb@osucascades.edu
Thank you! We have some free electives programmed in and PH315 would be a great option. We will have to see what we can do.
Have a great weekend,
Becca

Definitely should take those courses.

We have some more advanced courses that might also be useful - and Ryan would probably love to teach. Notably PH315 Physics of Contemporary Challenges.

On 4/26/19 3:39 PM, Webb, Rebecca wrote:

Hi, Heidi:
OSU-Cascades has proposed an Engineering Science degree. As part of the curriculum, we have proposed our students to take:

- PH 211
- PH 212
- PH 213

We would like liaison input on the inclusion of these courses from the physics department. Would you mind directing me to the right person for this request?
Thanks,
Becca

Rebecca Webb, PhD | Program Lead & Instructor
Tykeson Faculty Scholar in Energy Systems Engineering
541.322.3167 | rebecca.webb@osucascades.edu

Heidi Schellman
Head, Department of Physics
Oregon State University
Hi Becca,

I have added some general comments on the pdf. These might actually be more questions than comments, and possibly more due to my lack of understanding about the process or the structure than anything else.

It looks like a really exciting initiative. As a scientist of sorts the thought of mixing the scientific enquiry method with the practical applications of engineering suggests graduates ideally suited for the real world applications and practical development of the commercial (bio)science field just like we have growing in Bend.

In terms of the College of Science courses you have listed, the chemistry math and physics courses are all well situated to absorb the expected increase in enrollment resulting from the Engineering Sciences program and would subsequently benefit from doing so. There are two additional Math Instructors due to begin this summer and a third Chemistry Instructor was hired this academic year. As subsequent growth continues in the chemistry classes, this would support the addition of the engineering specific chemistry sequence (CH 201,202,205) allowing the more efficient targeting of core concepts for relevant majors. Physics should be considered a scheduling priority, as there is only one instructor currently, but there is ample room in the class sections for growth. As growth does continue, exploring the opportunity to hire an additional instructor/adjunct would also result in increased flexibility for the other majors requiring physics.

I am looking forward to meeting the new Engineering Science students in a few years.

Thanks,

Scott
Hi, Scott:
OSU-Cascades has proposed an Engineering Science degree. As part of the curriculum, we have proposed our students to take:

- CH 231
- CH 261
- CH 232
- PH 211
- PH 212
- PH 213
- MTH 251
- MTH 252
- MTH 254
- MTH 256
- MTH 264

We would like your liaison input on the inclusion of these courses. I have attached an executive summary of the proposal to this email to provide context. If you could please provide me with feedback by 5/03, it would be most appreciated.

Thanks,
Becca
## OSU Internal Budget Outline Form

**Estimated Costs and Sources of Funds for Proposed Program**

Total new resources allocated to the Proposed Program, if any. If no change in resources is required, the budgetary impact should be reported as zero.

### Program Title
- **BSES, Bachelor of Science in Engineering Science**

### Budget Period
- From FY 20 to FY 23

### Business Center
- CCBO

### Date
- 2/19/2018

### Name and Title of Reviewer
- Terri Libert, Budget Development and Reporting Manager

### Signature of Reviewer

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**Note:** Please include budget narrative describing items listed above.
**PROGRAM TITLE:** BSES, Bachelor of Science in Engineering Science  
**BUDGET PERIOD:** From FY 20 to FY 23  
**Business Center**  
**Name and Title of Reviewer:** Terri Libert, Budget Development and Reporting Manager  
**CCBO Date:** 2/19/2018

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**Other Resources Subtotal:** 8,750 | 8,870 | 11,502 | 11,647

### Physical Facilities

| Construction | - | - | - | - |
| Major Renovation | - | - | - | - |

**Physical Facilities Subtotal:** - | - | - | -

### Total Cost of Program

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### Resources

| Current Budget, unit | - | - | 86,156 | 93,381 |
| Tuition ( e campus, differential ) | 128,052 | 175,857 | 226,417 | 244,869 |

**Institutional Reallocation from other budgetary units**

| Special State Appropriation | - | - | - | - |
| Federal Funds and other Grants | - | - | - | - |
| Fees/Sales | - | - | - | - |
| Foundation Endowment | - | - | - | - |
| Tuition remission (GA support) | - | - | - | - |
| Other, describe: | - | - | - | - |

**Total Resources:** 128,052 | 175,857 | 312,573 | 338,250

**Note:** Please include budget narrative describing items listed above.
### OSU Internal Budget Outline Form

**Program Title:** BSES, Bachelor of Science in Engineering Science

**Budget Period:** From FY 20 to FY 23

| Name and Title of Reviewer | Terri Libert, Budget Development and Reporting Manager |

#### Recurring

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#### Other Expenses

| Library, Printed |              |              |              |              |
| Library, Electronic |              |              |              |              |
| Services & Supplies | 2,000 | - | 4,000 | - |
| Capital Equipment |              |              |              |              |
| **Other Resources Subtotal** | 2,000 | - | 4,000 | - |

#### Physical Facilities

| Construction |              |              |              |              |
| Major Renovation |              |              |              |              |
| Other Expenses |              |              |              |              |
| **Physical Facilities Subtotal** | - | - | - | - |

| **Total Cost of Program** | 2,000 | - | 4,000 | - |

#### Resources

| Current Budget, unit | 4,000 |
| Tuition (e campus, differential) |        |
| Institutional Reallocation from other budgetary units |        |
| Special State Appropriation |        |
| Federal Funds and other Grants |        |
| Fees/Sales |        |
| Foundation Endowment |        |
| Tuition remission (GA support) |        |
| Other, describe: |        |

| **Total Resources** | - | - | 4,000 | - |

**Note:** Please include budget narrative describing items listed above.
Personnel:

Faculty, Tenured/tenure-track: None planned during budget period

Faculty, Fixed-term:

Full-time Instructors:
- One instructor at $65,000 in Year 1, escalated at 3% per year
  - Additional $3,500 per year for summer pay
- One additional instructor at $65,000 in Year 3, escalated at 3% per year
  - Additional $3,500 per year for summer pay

Part-time Instructors:
- Pay rate for 9-month part-time instructors is $43,002
- Year 1 = 0.00 FTE = $0
- Year 2 = 0.14 FTE = $6,143
- Year 3 = 0.80 FTE = $34,402
- Year 4 = 1.06 FTE = $45,459

Graduate Assistants: No new graduate assistants

Support Staff: One 0.33 FTE Machine Shop Staff at $45,000 base salary in Year 3, escalated at 3% per year

OPE:

Full-time Instructors:
- Fixed OPE (health benefits) = $17,209 for year 1, escalated at 3% per year
- Variable OPE (retirement and other benefits) = 37.08%, escalated at 3% per year plus 2% for potential additional State PERS liability passed on to the institution
- Total OPE:
  - Year 1 = $35,760
  - Year 2 = $46,085
  - Year 3 = $97,783
  - Year 4 = $105,518

Part-time Instructors:
- Variable OPE (other benefits only) = 9.83% in Year 2, escalated at 3% per year
  - Year 1 = $0
  - Year 2 = $622
  - Year 3 = $3,586
  - Year 4 = $4,881

Support Staff:
- Variable OPE only = 43.4% in Year 3, escalated at 3% per year
  - Year 1 = $0
  - Year 2 = $0
  - Year 3 = $6,504
  - Year 4 = $7,208
**Student Workers:**
- Year 1 = $1,265
- Year 2 = $1,293
- Year 3 = $2,640
- Year 4 = $2,695

**Other Expenses:**

**Library:** No new printed or electronic materials

**Services and Supplies:**

**Recurring:**
- Department operating expense
  - Office supplies = $50 per year in Years 1-2, $150 per year in Years 3-4
  - Postage = $100 per year
  - Lab supplies = $1,200 in Year 1, $1,320 in Year 2, $1,452 in Year 3, $1,597 in Year 4
  - Lab equipment = $5,000 per year
- Professional development
  - $2,400 in Years 1-2
  - $4,800 in Years 3-4

**One-Time:**
- New hire set-up costs = $2,000 in Year 1 and $4,000 in Year 3

**Capital Equipment:** None

**Facilities Renovation:** None

**Resources:**

**Current Budget:** Support from OSU-Cascades E&G Funds including campus tuition, fees, and allocation of Student Success and Completion funding from State of Oregon Higher Education Coordinating Commission
- Year 1 = $0
- Year 2 = $0
- Year 3 = $90,156
- Year 4 = $93,381

**Tuition:** Tuition generated from students enrolled in major (net of 10% Fee Remission)
- Year 1 = 11.85 FTE for academic year = $128,052
- Year 2 = 15.80 FTE for academic year = $175,857
- Year 3 = 19.75 FTE for academic year = $226,417
- Year 4 = 20.74 FTE for academic year = $244,869
New Degree Program Proposal
Engineering Science

Status: Pending Review - Faculty Senate Exec Committee (Previous Version)

1. Review - College Approver - Engineering
Approved by Frank Chaplen Associate Professor / Biol & Ecol Engineering, May 19, 2019 7:58am

2. Review - Curriculum Coordinator
Sent Back by Janice Nave-Abele Curriculum Coordinator / Acad Progms & Assessment, May 22, 2019 9:08am
Comments
Janice Nave-Abele (Curriculum Coordinator) May 22, 2019 9:08am
Sent back to Originator for updates.

3. Originator Response
Rebecca Webb Instructor-Engineering / Acad Prog / Student Aff, June 20, 2019 12:46pm
Comments
Rebecca Webb June 20, 2019 12:46pm
All of Janice's recommendations made and documents updated.

4. Review - Curriculum Coordinator
Approved by Janice Nave-Abele Curriculum Coordinator / Acad Progms & Assessment, June 27, 2019 9:25am
Comments
Janice Nave-Abele (Curriculum Coordinator) June 27, 2019 9:25am
Please correct/align the WIC course information in the proposal. Email regarding this sent to Originator on 5/26.

5. Review - Graduate School
Approved by Janice Nave-Abele Curriculum Coordinator / Acad Progms & Assessment, June 27, 2019 9:50am
Comments
Janice Nave-Abele (Graduate School) June 27, 2019 9:50am
This is an undergraduate program and does not require Graduate School approval.

6. Review - Budgets and Fiscal Planning Committee
Sent Back by Andrew Ibarra Dir-Physical Activity Program / Sch of Bio/Pop Hlth Sci, October 4, 2019 3:34pm
Comments
Andrew Ibarra (Budgets and Fiscal Planning Committee) October 4, 2019 3:34pm
We had several questions:
1) Do supplies and equipment costs match need-seem low to potential needs. Are you using course fees to offset some of these costs? Are you using existing equipment from other programs disciplines?
2) Would there be additional marketing/outreach costs? How would updating websites, promotional materials be covered? Or does the larger Cascades budget account for this?
3) Would .33 FTE for the Machine Shop Staff cover the needs of the 19.75 FTE of students that would need access to a Machine Shop? And how? Is the shop open for 13 hours a week, staff by student workers as well, etc. Is it already managed by costs through another program discipline?

4) Please move the student worker out of the supplies and services section and allocate them in personnel. You may have already identified the OPE with them, but that should also be identified in there.

If you have questions on our questions dont hesitate to call (76811)

7. Originator Response

Rebecca Webb Instructor-Engineering / Acad Prog / Student Aff, October 11, 2019 1:58pm

Comments

Rebecca Webb October 11, 2019 1:58pm
All questions answered in document called Response_10_11_2019 which was uploaded to the Other Attachments section of the proposal. Also, the budget was updated to address #4. Thank you.

8. Review - Budgets and Fiscal Planning Committee

Approved by Andrew Ibarra Dir-Physical Activity Program / Sch of Bio/Pop Hlth Sci, October 18, 2019 11:11am

Comments

Andrew Ibarra (Budgets and Fiscal Planning Committee) October 18, 2019 11:11am
We approve, but recommend you also clarify how you plan to cover costs of additional course development. It may be within workload or not, but clarification on that would be recommended. Also clarify costs for advising, are those central, absorbed within current operations?

9. Review - Graduate Council Chair

Approved by John Becker-Blease Associate Dean / College of Business Dept, October 21, 2019 8:31am

Comments

John Becker-Blease (Graduate Council Chair) October 21, 2019 8:31am
No Graduate Implications. No concerns.

10. Review - Curriculum Council Chair

Sent Back by Michele Swift Senior Instructor I / College of Business Dept, December 2, 2019 9:18am

Comments

Michele Swift (Curriculum Council Chair) December 2, 2019 9:18am
Please attach the updated proposal and executive summary. Reference attachment RE_Engineering Science Cat I.pdf for comments and responses.

11. Originator Response

Rebecca Webb Instructor-Engineering / Acad Prog / Student Aff, December 2, 2019 9:37am

Comments

Rebecca Webb December 2, 2019 9:37am
Updated executive summary and proposal attached.

12. Review - Curriculum Council Chair

Approved by Michele Swift Senior Instructor I / College of Business Dept, December 6, 2019 4:15pm

Comments

Michele Swift (Curriculum Council Chair) December 6, 2019 4:15pm
The CC approved the proposal but we recommend the following:
1) Take steps to lower the student-adviser ratio. While your ratio of 275:1 appears to be consistent with the national median ratio, NACADA suggests that this load should be adjusted downward, depending on
the student advised, the complexity of the curriculum and the other job responsibilities assigned to the adviser.
2) Work with MIME to differentiate the course descriptions for MIME 497 and MIME 498. Having two courses with identical course descriptions risks creating confusion for students.

13. Review - Faculty Senate Exec Committee

Pending Review

More Queued Reviews (4)

Faculty Senate; Provost /Academic Affairs; Academic Programs; Catalog Coordinator

Proposal
Proposal ID: 102102
Type: New Degree Program
Submission Date: December 2, 2019 9:37am
Comments: None

History
Active Version - Submitted December 2, 2019 9:37am
Version 3 - Submitted October 11, 2019 1:58pm
Version 2 - Submitted June 20, 2019 12:46pm
Version 1 - Submitted April 29, 2019 11:42am

Originators

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<td>Rebecca Webb</td>
<td>Instructor-Engineering</td>
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Contacts

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<tr>
<td>Julie Gess-Newsome</td>
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<td>Acad Prog / Student Aff</td>
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Proposal Details
College: College of Engineering
Department/School: No Department
Program Type: Undergraduate Major
New Degree Name: Engineering Science

Supporting Documents

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* Letters of Support

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COCO  Letter_COCO.pdf (59.89 Kb added Dec 02, 2019 9:18 am )

PSU  Letter_PDX_EE.pdf (83.21 Kb added Dec 02, 2019 9:18 am )

PSU  Letter_PDX_Mechanical.pdf (85.45 Kb added Dec 02, 2019 9:18 am )

ElementI  Support Letter 5Mar2018.pdf (580.27 Kb added Dec 02, 2019 9:18 am )

PE1  PE Letter of Support - Tom Headley 2018-03-21.pdf (11.42 Kb added Dec 02, 2019 9:18 am )

PE2  SupportLetter_Guy.pdf (9.78 Kb added Dec 02, 2019 9:18 am )

* Accessibility Form

Accessibility_Signed.pdf (45.50 Kb added Dec 02, 2019 9:18 am )

* Library Evaluation

2017 Cascades Cat I Engineering Science Library Evaluation.pdf (45.15 Kb added Dec 02, 2019 9:18 am )

* Faculty CVs

Chris_Hagen_October_2017.CV.pdf (205.01 Kb added Dec 02, 2019 9:18 am )

Bahman Abbasi - CV (OSU-Cascades).pdf (593.53 Kb added Dec 02, 2019 9:18 am )

kwebb.CV.2017.pdf (78.45 Kb added Dec 02, 2019 9:18 am )

RWebb.CV.2017.pdf (58.14 Kb added Dec 02, 2019 9:18 am )

Other Attachments

Engineering Science_Space Letter 2017_FINAL.pdf (921.50 Kb added Dec 02, 2019 9:18 am )

Space Evaluation

ug_assessment.apa_reporting_template.xlsx (42.96 Kb added Dec 02, 2019 9:18 am )

EngineeringScience_AssessmentPlanFeedback_Heath.pdf (49.61 Kb added Dec 02, 2019 9:18 am )

Response_10_11_2019.docx (13.96 Kb added Dec 02, 2019 9:18 am )

RE_ Engineering Science Cat I.pdf (84.73 Kb added Dec 02, 2019 9:18 am )

LIAISONS

* Liaisons

Richard Nafshun

Request: None

Response: RE_ OSU-Cascades Engineering Science Program (proposed) - requesting input from chemistry.pdf (64.16 Kb added Dec 02, 2019 9:18 am )
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<td>Heidi Schellman</td>
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<td>Scott Geddes</td>
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