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General Information

Give a brief (1-2 paragraphs) overview of the proposed credential, including its disciplinary foundations and connections, its focus and learning objectives for students, and the specific degree (e.g. bachelors, masters, doctorate) and/or credentials (e.g. major, certificate, minor, concentrations) to be offered. This should be based largely on your descriptions in the following sections but it should be shorter than their combined length. Moreover, it should use language that is capable of communicating your ideas to audiences increasingly distant from your academic field as your proposal moves through the review process.

We propose a new BS undergraduate degree in bioengineering to capitalize upon substantial new investments being made at the University of Oregon.

Establishment of the Phil and Penny Knight Campus for Accelerating Scientific Impact (Knight Campus) creates a unique moment in time for the University of Oregon. The initial $500 million gift from the Knights, together with additional support from the state, allows the creation of new world class research and teaching facilities. Even more importantly, the Knight Campus is bringing an entirely new group of faculty to the UO campus (five in just the first year of the program), which greatly expands our capacity for teaching in the sciences—particularly within more applied areas of science.

The new executive director of the Knight Campus, Robert Guldberg, was previously the director of one of the top bioengineering research institutes in the country at Georgia Tech. Georgia Tech also has the top-rated bioengineering program at a public US university. The Knight Campus has already hired a number of new bioengineers into its faculty and will continue to do so over the next several years. Together with existing expertise on campus (e.g., the Departments of Biology, Human Physiology, and Chemistry), it is an ideal time to create a new degree program to capture this new talent and translate it into a new growth area for the UO with real-world impacts on the training of our students.

Based in a new program within the College of Arts and Sciences, the Bioengineering Program curriculum is designed to exemplify the goal of the Knight Campus to engage students in discovery-driven learning. Students will be immersed in problem- and design- based learning, starting in the first quarter they enroll. This will continue with the “Fundamentals of Bioengineering” series during students’ sophomore year, where foundational engineering concepts are presented to students through a combination of lectures, small team problem solving, and experimental and design-based lab work in the state-of-the-art educational facilities at the Knight Campus. This hands-on learning approach will continue throughout the upper-division coursework, which integrates multiple bioengineering laboratory courses, a bioengineering design course, and culminates with a senior capstone design series.

Specific courses that constitute the degree program were selected through a combination of ABET accreditation requirements and a comprehensive curriculum survey of top-ranked bioengineering programs in the Pacific Northwest and nationwide. The curriculum is multidisciplinary, featuring extensive coursework in mathematics, chemistry, biology, and physics during the lower division component of the education. This foundation in the natural sciences prepares students for a focused concentration of engineering work at the upper-division level.
Primary Proposer: Mike Hahn

Is there a co-proposer for this proposal?

<table>
<thead>
<tr>
<th>Name</th>
<th>Home Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Hutchison</td>
<td>Knight Campus</td>
</tr>
<tr>
<td>Robert Guldberg</td>
<td>Knight Campus</td>
</tr>
</tbody>
</table>

Home department: Bioengineering

College: Arts and Sciences

Additional Department Affiliations: No

Level: Undergraduate

Program Type: Degree

Degree Type: Bachelor of Science

By default, the program will be approved for the Bachelor of Arts and Bachelor of Science. If you are only requesting one of these, please indicate below:

Bachelor of Science

Primary Location: UO main campus

Additional Location(s): No

Program Delivery Format: Traditional classroom/lab

Does the program represent a collaboration of two or more university academic units? No

Proposed Identification

Full Title: Bioengineering

What’s your desired effective date? 2021
**Program Description**

Is there a core set of required courses? Yes

What is the core set of required courses and what is the rationale for giving these courses this prominent role? What are the central concepts and/or skills you expect students to take from the core?

The core set of required courses are listed below. The courses in mathematics and the natural sciences provide a foundational framework upon which advanced engineering concepts can be built and are necessary in order for the degree to satisfy ABET accreditation requirements.

Each of the bioengineering courses that are designated as part of the core curriculum have a focus on experiential-, problem- and design- based learning, which is at the heart of the pedagogy for the new degree.

**Core Courses:**

Math: 251, 252, 253, 256, 343 or MATH/DSCI 345

Chemistry: 221+227 or 224H+237, 222+228 or 225H+238, 223+229 or 226H+239, 331

Physics: 251, 252, 253

Biology: 211 or 281H

CIS 122 or 210 (210 recommended)

Bioengineering:

112 – Interdisciplinary Approaches to Bioengineering
113 – Research Methods in Bioengineering
251, 252, 253 - Fundamentals of Bioengineering I, II, III
321, 322 – Bioengineering Lab I, II
421, 422, 423 – Bioengineering Design, Bioengineering Capstone Design I, Bioengineering Capstone Design II

What is the relationship between upper-division courses and the lower-division curriculum? For example, are fundamental principles introduced in the lower division and then applied to increasingly complex problems at the upper-division? This vertical architecture is common in the sciences but is by no means universal. In the humanities, a more horizontal structure is often appropriate. For example, students might read and analyze literature at each level (100-400) but do so with increasing sophistication and the capacity to draw on a widening array of literary forms and ideas.

Upper-division and lower-division courses follow a standard vertical architecture where fundamental principles are introduced in the lower division and then applied to increasingly complex problems at the upper-division

Are there specific course-to-course prerequisites that help students extend or link ideas or are the intellectual connections among courses in your major more general?
The lower-division curriculum relies heavily on specific course-to-course prerequisites, especially within the mathematics, chemistry, and physics series as well as the newly proposed 200-level Fundaments of Bioengineering series. Upper-division coursework focuses on general intellectual connections and can be taken in any order once upper-division status is achieved.

Specific prerequisites and course sequences are outlined below.

MATH 251, 252, 253, 256 must be taken in order. MATH 343 must be taken after MATH 252.

CH 221, 222, 223, 331 must be taken in order

PHYS 251, 252, 253 must be taken in order

BI 211 has CH 221 as a prerequisite

BIOE 251, 252, 253 must be taken in order.

BIOE 251 requires that MATH 251 be completed and PHYS 251 be taken concurrently

BIOE 421, 422, 423 must be taken in order

**Are there tracks or concentrations within the credential? If so, do these start from a common core or are they differentiated from the beginning?**

No tracks or concentrations will be offered at this time. As the program matures, concentrations may develop, particularly within the areas of imaging, biomechanics, cell and tissue engineering, and bioinformatics. Any concentrations that are offered in the future would proceed via usual approval processes.
Course of Study

Describe the course of study – proposed curriculum, including course numbers, titles, and credit hours.

Specific courses and program learning outcomes that constitute the course of study were selected through a combination of ABET accreditation requirements and a comprehensive curriculum survey of top-ranked bioengineering programs in the Pacific Northwest and nationwide.

Major Requirements

Key:
* Should be completed prior to Upper-Division BIOE Status (BIOE 300- or 400-level courses)
399: 300-level course that is yet to be regularized.
410: 400-level course that is yet to be regularized.

Mathematics – 20 Credits

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>*MATH 251</td>
<td>Calculus I</td>
<td>4</td>
<td>MATH 112 or test placement</td>
</tr>
<tr>
<td>*MATH 252</td>
<td>Calculus II</td>
<td>4</td>
<td>MATH 251</td>
</tr>
<tr>
<td>*MATH 253</td>
<td>Calculus III</td>
<td>4</td>
<td>MATH 252</td>
</tr>
<tr>
<td>*MATH 256</td>
<td>Intro to Differential Equations</td>
<td>4</td>
<td>MATH 253</td>
</tr>
<tr>
<td>MATH 343</td>
<td>Statistical Models and Methods</td>
<td>4</td>
<td>MATH 252</td>
</tr>
</tbody>
</table>

Natural Sciences – 38 Credits

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>*CH 221+227 or CH 224+237</td>
<td>General Chemistry I + Lab</td>
<td>6</td>
<td>MATH 111 Coreq: 112</td>
</tr>
<tr>
<td></td>
<td>Advanced General Chemistry I + Lab</td>
<td></td>
<td>High school chemistry, MATH 112, coreq: one from MATH 241, MATH 246, MATH 251, MATH 261</td>
</tr>
<tr>
<td>*CH 222+228 or CH 225+238</td>
<td>General Chemistry II + Lab</td>
<td>6</td>
<td>CH 221, MATH 112</td>
</tr>
<tr>
<td></td>
<td>Advanced General Chemistry II + Lab</td>
<td></td>
<td>CH 221 or CH224H; one from MATH 241, MATH 246, MATH 251, MATH 261; coreq: one from MATH 242, MATH 247, MATH 252, MATH 262</td>
</tr>
<tr>
<td>*CH 223+229 or CH 226+239</td>
<td>General Chemistry III + Lab</td>
<td>6</td>
<td>CH 222, MATH 112</td>
</tr>
<tr>
<td></td>
<td>Advanced General Chemistry III + Lab</td>
<td></td>
<td>CH 222 or CH 225H; one from MATH 242, MATH 247, MATH 252, MATH 262 with grades of C- or better. coreq: one from MATH 243, MATH 247, MATH 253, MATH 263</td>
</tr>
</tbody>
</table>
CH 331 Organic Chemistry I 4 CH 223 or CH226H
*PHYS 251 Foundations of Physics I 4 MATH 112 or equiv. Coreq: MATH 251
*PHYS 252 Foundations of Physics II 4 PHYS 251 Coreq: MATH 252
*PHYS 253 Foundations of Physics III 4 PHYS 252 Coreq: MATH 253
*BI 211 General Biology I: Cells 4 CH 111 or CH 113 or CH 114 or CH 221 or CH 224H

Or

BI 281H Honors Biology I: Cells, Biochemistry and Physiology

Prereq: MATH 111 or equivalent with B– or better or minimum AP/IB mathematics score of 4/5, and CH 221, CH 222, CH 223 or CH 224H, CH 225H, CH 226H with B– or better in all courses.

Computer and Information Science – 4 Credits

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 122</td>
<td>Intro to Programming and Problem Solving</td>
<td>4</td>
<td>MATH 101</td>
</tr>
<tr>
<td>-or-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS 210</td>
<td>Computer Science I</td>
<td>4</td>
<td>MATH 112. Prior programming experience strongly encouraged</td>
</tr>
</tbody>
</table>

Bioengineering Core – 36 Credits

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>*BIOE 112</td>
<td>Interdisciplinary Approaches to Bioengineering</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>*BIOE 113</td>
<td>Research Methods in Bioengineering</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>*BIOE 251</td>
<td>Fundamentals of Bioengineering I</td>
<td>4</td>
<td>MATH 251, Coreq PHYS 251</td>
</tr>
<tr>
<td>*BIOE 252</td>
<td>Fundamentals of Bioengineering II</td>
<td>4</td>
<td>BIOE 251</td>
</tr>
<tr>
<td>*BIOE 253</td>
<td>Fundamentals of Bioengineering III</td>
<td>4</td>
<td>BIOE 252</td>
</tr>
</tbody>
</table>

Upper-Division

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 321</td>
<td>Bioengineering Lab I</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 322</td>
<td>Bioengineering Lab II</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 421</td>
<td>Bioengineering Design I</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 422</td>
<td>Bioengineering Capstone Design I</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 423</td>
<td>Bioengineering Capstone Design II</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
</tbody>
</table>

Bioengineering Electives – Select 32 Credits
<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 331</td>
<td>Biomaterials</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 341</td>
<td>Quantitative Physiology</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 342</td>
<td>Quantitative Cell &amp; Molecular Biology</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 454</td>
<td>Biotransport</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 332</td>
<td>Biomedical Signals</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 399</td>
<td>Biomechanics</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 333</td>
<td>Systems in Bioengineering</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 442</td>
<td>Cell and Tissue Engineering</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 410</td>
<td>Advanced Tissue Engineering</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 410</td>
<td>Bioinstrumentation</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 410</td>
<td>Computational Modeling</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 432</td>
<td>Biomedical Imaging</td>
<td>4</td>
<td>Upper-Division BIOE Status</td>
</tr>
<tr>
<td>BIOE 401</td>
<td>Undergraduate Research</td>
<td>1-4</td>
<td>Upper-Division BIOE Status</td>
</tr>
</tbody>
</table>
### Expected Learning Outcomes for Students and Means of Assessment

<table>
<thead>
<tr>
<th>Principle Learning Outcome (Concept or Skill)</th>
<th>Part of curriculum where this is introduced</th>
<th>Part of curriculum where this is developed</th>
<th>How students demonstrate mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.</td>
<td>BIOE 113 Research Methods in Bioengineering</td>
<td>BIOE 253 Fundamentals of Bioengineering III BIOE 331 Biomaterials BIOE 399 Signals BIOE 399 Biomechanics BIOE 399 Cell and Tissue Engineering BIOE 410 Biomedical Imaging BIOE 454 Biotransport</td>
<td>BIOE 410 Computational Modeling BIOE 422 Capstone Design I</td>
</tr>
<tr>
<td>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>BIOE 252 Fundamentals of Bioengineering II BIOE 253 Fundamentals of Bioengineering III</td>
<td>BIOE 399 Cell and Tissue Engineering BIOE 410 Biomedical Imaging BIOE 421 Bioengineering Design I</td>
<td>BIOE 422 Bioengineering Capstone Design I BIOE 423 Bioengineering Capstone Design II</td>
</tr>
<tr>
<td>Communicate effectively with a range of audiences.</td>
<td>BIOE 112 Interdisciplinary Approaches to Bioengineering BIOE 113 Research Methods in Bioengineering</td>
<td>BIOE 341 Quantitative Physiology BIOE 421 Bioengineering Design I</td>
<td>BIOE 422 Bioengineering Capstone Design I BIOE 423 Bioengineering Capstone Design II</td>
</tr>
<tr>
<td>Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic,</td>
<td>BIOE 112 Interdisciplinary Approaches to Bioengineering</td>
<td>BIOE 253 Fundamentals of Bioengineering III BIOE 341 Quantitative Physiology BIOE 399 Cell and Tissue Engineering BIOE 421 Bioengineering Design I</td>
<td>BIOE 422 Bioengineering Capstone Design I BIOE 423 Bioengineering Capstone Design II</td>
</tr>
<tr>
<td>Principle Learning Outcome (Concept or Skill)</td>
<td>Part of curriculum where this is introduced</td>
<td>Part of curriculum where this is developed</td>
<td>How students demonstrate mastery</td>
</tr>
<tr>
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</tr>
<tr>
<td>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>BIOE 112 Interdisciplinary Approaches to Bioengineering&lt;br&gt;BIOE 113 Research Methods in Bioengineering&lt;br&gt;BIOE 252 Fundamentals of Bioengineering II</td>
<td>BIOE 253 Fundamentals of Bioengineering III&lt;br&gt;BIOE 321 Bioengineering Lab I</td>
<td>BIOE 322 Bioengineering Lab 2&lt;br&gt;BIOE 421 Bioengineering Design I&lt;br&gt;BIOE 422 Bioengineering Capstone Design I&lt;br&gt;BIOE 423 Bioengineering Capstone Design II</td>
</tr>
<tr>
<td>Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.</td>
<td>BIOE 113 Research Methods in Bioengineering&lt;br&gt;BIOE 252 Fundamentals of Bioengineering II</td>
<td>BIOE 253 Fundamentals of Bioengineering III&lt;br&gt;BIOE 331 Biomaterials&lt;br&gt;BIOE 341 Quantitative Physiology&lt;br&gt;BIOE 342 Quantitative Cell &amp; Molecular Biology&lt;br&gt;BIOE 399 Signals&lt;br&gt;BIOE 399 Biomechanics&lt;br&gt;BIOE 321 Bioengineering Lab I&lt;br&gt;BIOE 410 Bioinstrumentation</td>
<td>BIOE 322 Bioengineering Lab II&lt;br&gt;BIOE 410 Biomedical Imaging</td>
</tr>
<tr>
<td>Acquire and apply new knowledge as needed, using appropriate learning strategies.</td>
<td>BIOE 113 Research Methods in Bioengineering</td>
<td>BIOE 253 Fundamentals of Bioengineering III&lt;br&gt;BIOE 331 Biomaterials&lt;br&gt;BIOE 341 Quantitative Physiology&lt;br&gt;BIOE 399 Biomechanics&lt;br&gt;BIOE 321 Bioengineering Lab I&lt;br&gt;BIOE 410 Biomedical Imaging</td>
<td>BIOE 322 Bioengineering Lab II&lt;br&gt;BIOE 421 Bioengineering Design I&lt;br&gt;BIOE 422 Bioengineering Capstone Design I&lt;br&gt;BIOE 423 Bioengineering Capstone Design II</td>
</tr>
<tr>
<td>Principle Learning Outcome (Concept or Skill)</td>
<td>Part of curriculum where this is introduced</td>
<td>Part of curriculum where this is developed</td>
<td>How students demonstrate mastery</td>
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</tr>
<tr>
<td>Apply principles of engineering, biology, human physiology, chemistry, calculus-based physics, mathematics (through differential equations) and statistics.</td>
<td>BIOE 251 Fundamentals of Bioengineering I</td>
<td>BIOE 331 Biomaterials BIOE 341 Quantitative Physiology BIOE 342 Quantitative Cell &amp; Molecular Biology BIOE 399 Signals in Bioengineering BIOE 399 Biomechanics BIOE 399 Systems in Bioengineering BIOE 321 Bioengineering Lab I BIOE 399 Cell and Tissue Engineering BIOE 410 Biomedical Imaging BIOE 454 Biotransport</td>
<td>BIOE 410 Computational Modeling BIOE 322 Bioengineering Lab II BIOE 421 Bioengineering Design I BIOE 423 Bioengineering Capstone Design II</td>
</tr>
<tr>
<td>Solve bio/biomedical engineering problems, including those associated with the interaction between living and non-living systems.</td>
<td>BIOE 251 Fundamentals of Bioengineering I</td>
<td>BIOE 253 Fundamentals of Bioengineering III BIOE 342 Quantitative Cell &amp; Molecular Biology BIOE 399 Signals in Bioengineering BIOE 399 Systems in Bioengineering BIOE 321 Bioengineering Lab I BIOE 399 Cell and Tissue Engineering BIOE 410 Biomedical Imaging BIOE 454 Biotransport</td>
<td>BIOE 454 Biotransport BIOE 410 Computational Modeling BIOE 322 Bioengineering Lab II</td>
</tr>
<tr>
<td>Analyze, model, design, and realize bio/biomedical engineering devices, systems, components, or processes.</td>
<td>BIOE 251 Fundamentals of Bioengineering I</td>
<td>BIOE 252 Fundamentals of Bioengineering II BIOE 331 Biomaterials BIOE 342 Quantitative Cell &amp; Molecular Biology BIOE 399 Signals in Bioengineering BIOE 410 Biomedical</td>
<td>BIOE 421 Bioengineering Design I</td>
</tr>
<tr>
<td>Principle Learning Outcome (Concept or Skill)</td>
<td>Part of curriculum where this is introduced</td>
<td>Part of curriculum where this is developed</td>
<td>How students demonstrate mastery</td>
</tr>
<tr>
<td>---------------------------------------------</td>
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</tbody>
</table>
| Make measurements on and interpret data from living systems. | BIOE 252 Fundamentals of Bioengineering II | Imaging  
BIOE 410  
Bioinstrumentation  
BIOE 253 Fundamentals of Bioengineering III  
BIOE 342 Quantitative Cell & Molecular Biology  
BIOE 399 Signals in Bioengineering  
BIOE 399 Biomechanics  
BIOE 321 Bioengineering Lab I | BIOE 410  
Bioinstrumentation  
BIOE 410 Computational Modeling  
BIOE 322 Bioengineering Lab II |

If needed, explain particular items in the grid:
N/A

If needed, describe your curriculum map in narrative form, as an alternate to the grid:
N/A

What is the nature and level of research and/or scholarly work expected of program faculty which will be indicators of success in those areas?

Appointments for tenure-track faculty will primarily be within the Knight Campus. As such, TTF will be expected to conduct innovative and impactful research demonstrated through a history of successfully awarded grants, journal publications, and conference presentations. Please see the attached CV of current faculty as evidence of the type and level of research and scholarly work typical for program faculty.

TTF and NTTF instructors will be expected to deliver high quality, engaging courses, as measured by student course evaluations, success of students, and peer evaluations when appropriate.

Explain the methods by which the learning outcomes will be assessed and used to improve curriculum and instruction.

Attainment of learning outcomes will be assessed through a variety of feedback mechanisms including course examinations, course projects, senior design and capstone projects, and student surveys and interviews. Instructor evaluations and student success will be used to ensure instruction is delivered in a high quality, engaging manner and to identify any areas of instruction needing improvement. Graduating students will also be followed in order to measure success in admission to graduate or professional education or gainful employment.
Resources

List any additional faculty who will have a role in this program as a result of the change(s), indicating those who will have leadership and/or coordinating roles. For each individual, indicate status with respect to tenure track (TT or NTT), rank, and full-time or part-time.

Because of the unique opportunity that this degree represents, the overall process departs slightly from the regular cycle. Many of the leadership and instructional roles involved in growing and sustaining the program will be filled by faculty that are part of current and future searches within the Knight Campus. Because faculty lines within the Knight Campus are self-funded, fulfilling the commitment to faculty recruitment is independent of other university constraints that may or may not emerge over the next several years. Thus, the path towards the degree is secure.

Initial Knight Campus faculty searches have been highly successful, resulting in three tenure track hires that will add to the scholarship and instructional capabilities of the Bioengineering Program. Dr. Tim Gardner (TT - associate professor), was previously a biology and biomedical engineering faculty member at Boston University. Dr. Keat Ghee Ong (TT – full professor), was previously the Portage Health Foundation Endowed Professor and Associate Chair of the Biomedical Engineering at Michigan Technological University. Dr. Marian Hettiaratchi (TT – Assistant), will join in January 2020. She just completed a post-doctoral fellowship at the University of Toronto. Additional hiring is expected to continue at a rate of one to three tenure track faculty per year until approximately twelve faculty are in place. As this process develops, NTTF lecturers can fill any programmatic gaps that might exist during the hiring process.

The Bioengineering Program is in an unusual situation in that it needs to establish an academic program before many of its core TTF are appointed. Therefore, a task force has been established to lead the initiative until such time as faculty and supporting administration are in place. The task force members are:

- Robert Guldberg, Vice President and Robert and Leona DeArmond Executive Director for the Knight Campus
- Patrick Phillips, Provost and Senior Vice President, Professor of Biology
- Mike Hahn, Associate Professor of Human Physiology
- Jim Hutchison, Associate Vice President and Lokey-Harrington Chair in the Department of Chemistry and Biochemistry
- Nathan Jacobs, Curriculum Director ProTem

Describe how students will be advised in the new program.

Students will be able to seek advising through the services available in Tykeson Hall. Any advising needs that are not able to be met through Tykeson Hall will be handled through a faculty member in the program who will have a portion of FTE assigned to advising. As the program grows, the FTE allotment will be adjusted as needed to meet the needs of the students in the program. It is anticipated that as the program reaches full-scale (7-10 years), a dedicated advisor (1.0 FTE) will be provided by the program.
Other Program Characteristics

Must courses be taken for a letter grade and/or passed with a minimum grade to count toward the proposed major? If so, please list the courses and the requirements of each. Although there is variation in detail, UO majors typically require that most of the courses be taken for a letter grade (not “pass/no pass”) and that the grade be C- or better.

All courses taken to satisfy the bioengineering major requirements must be taken for a letter grade and passed with a grade of C- or better.

How much course overlap will be allowed to count toward both the major and some other credential a student might be earning (a minor, certificate, or another major)? If there are specific credentials with overlap limits, please list those and the limits.

There are no course overlap restrictions.

Does your proposal call for new courses, or conversion of experimental courses into permanent courses? If so, please list courses in the text box below and indicate when they will be submitted to UOCC for approval:

New courses are listed below, separated into lower-division and upper-division status. All of the new lower-division courses are currently submitted for review and approval. The upper-division curriculum consists of 4 courses that are currently submitted for approval, 10 courses that have been initiated in CourseLeaf but not sent for committee review, and 3 courses that will be developed during the 2019-2020 AY. The 5 upper-division BIOE Core courses (BIOE 321, 322, 421, 422, 423) will initially be offered as experimental and regularized after two cohorts have completed them. Please note, upper-division courses will not be offered until Fall 2023.

Lower-Division

BIOE 112  Interdisciplinary Approaches to Bioengineering – updating approval submission
BIOE 113  Research Methods in Bioengineering – updating approval submission
BIOE 251  Fundamentals of Bioengineering I – submitted for approval
BIOE 252  Fundamentals of Bioengineering II – submitted for approval
BIOE 253  Fundamentals of Bioengineering III – submitted for approval

Upper-Division

Note: upper-division courses will not be taught until the Fall 2023 term.

BIOE 331  Biomaterials – submitted for approval
BIOE 341  Quantitative Physiology – submitted for approval
BIOE 342  Quantitative Cell Biology – submitted for approval
BIOE 454  Biotransport – submitted for approval
BIOE 332  Signals in Bioengineering – placeholder created in CourseLeaf - submission planned 2019-2020 AY
BIOE 333  Systems in Bioengineering – placeholder created in CourseLeaf - submission planned 2019-2020 AY
BIOE 335  Cell and Tissue Engineering – placeholder created in CourseLeaf - submission planned 2019-2020 AY
BIOE 432  Biomedical Imaging – placeholder created in CourseLeaf - submission planned 2019-2020 AY
BIOE 410  Advanced Tissue Engineering – submission planned 2019-2020 AY
BIOE 410  Bioinstrumentation – submission planned 2019-2020 AY
BIOE 410  Computational Modeling – submission planned 2019-2020 AY
BIOE 321  Bioengineering Lab I – Placeholder created in CourseLeaf – this course will initially be offered as experimental then regularized
BIOE 322  Bioengineering Lab II – Placeholder created in CourseLeaf – this course will initially be offered as experimental then regularized
BIOE 421  Design I – Placeholder created in CourseLeaf – this course will initially be offered as experimental then regularized
BIOE 422  Capstone Design I – Placeholder created in CourseLeaf – this course will initially be offered as experimental then regularized
BIOE 423  Capstone Design II – Placeholder created in CourseLeaf – this course will initially be offered as experimental then regularized
BIOE 401  Undergraduate Research – placeholder created in CourseLeaf - submission planned 2019-2020 AY

Will admission to the program be limited?
Yes

Maximum enrollment:
400 (including pre-majors). Approximately 75-100 students per year will be admitted into the upper-division / “full-major”) portion of the program.

Will students be required to apply for entry to this program?
Yes

What are the conditions for admission?
Students will be required to apply for entry to the program. Students must be admitted to the program in order to enroll in 300- and 400- level bioengineering courses. Lower-division courses will be open to all students that satisfy the individual course prerequisites.
There will be two admission pathways into the bioengineering program: direct admission and upper-
division application. Direct admission will be available to incoming freshman students with outstanding 
high school academic records. Upper-division application will be available to students following 
completion of Math 253, Chem 223, PHYS 252 and BIOE 252. This will typically be spring of their 
sophomore year.

In order to provide the best access to the bioengineering program for as many students as possible, we 
plan to delay the adoption of direct admissions for freshmen until the program reaches a capacity-
constrained state. At program launch, we desire to implement a program admission model that 
emulates the current College of Business pre-major model (students apply for full major status after 
completing a specific set of prerequisite courses and have completed around 90 total credits). We feel 
confident this model will be possible to implement from a Registrar standpoint as it currently exists at 
the UO. We plan to initiate conversations with the Registrar’s office in the near future regarding the 
details of applying this type of pre-major option, as well as to inquire about the feasibility of a freshman 
direct admission process should the need arise.

We want to highlight that the freshman direct admission approach is not intended to be used as an 
exclusionary tool. Rather, it is meant to provide an assurance to freshman applicants that, should they 
decide to enroll at UO, they will be guaranteed a place in the Bioengineering Program and can earn a 
bioengineering degree as long as they remain academically qualified. This is likely to be of particular 
importance at UO, where alternative engineering programs are not available for a student to transition 
into if they are not accepted into the Bioengineering Program during the sophomore application 
window.

Additional Requirements (Will Appear in Catalog)

All courses counted towards the Bioengineering Major requirements must be taken for a letter grade 
and passed with a grade of C- or better.

Please describe admission procedures (Will Appear in Catalog)

Freshman applicants who meet UO admissions criteria and who list bioengineering as their first-choice 
major on their application will automatically be considered for Direct admission.

Upper-division applicants must have completed at least four quarters of equivalent college-level 
coursework, including Math 253, Chem 223, PHYS 252 and BIOE 252 and be on track to begin upper-
division department curriculum in the fall quarter of their junior year. Applications (available from the 
program) can be submitted during spring term of the application year up until the 10th week of the term. 
Admission decision will be based on GPA, average GPA in prerequisite bioengineering courses, letters of 
recommendation, and personal statement.

Residency Requirements (Will Appear in Catalog)

At least 34 credits of coursework applied to the major must be taken at the University of 
Oregon

The following courses must be completed at the University of Oregon and may count towards 
the 34-credit requirement:

BIOE 321  Bioengineering Lab I
BIOE 322  Bioengineering Lab II
BIOE 421  BIOE Design I
BIOE 422  BIOE Capstone Design I
BIOE 423  BIOE Capstone Design II