Category I Proposal Transmittal Sheet
Submit proposals to: Office of Academic Planning and Assessment
110 Kerr Admin -- Oregon State University

For instructions, see http://oregonstate.edu/ap/curriculum/cati.html. Please attach Proposal, Library Evaluation (performed by the library), Liaison Correspondence, Faculty Curriculum Vitae, and Budget Sheets, as appropriate.

Check one:

Full Proposal
☑ New degree program
☐ New certificate program or administrative unit
☐ Major change in existing program
☐ Establishment of a new College or Department

Abbreviated Proposal
☐ Rename of an academic program or unit
☐ Reorganization – moving responsibility for an academic program from one unit to another
☐ Merging or splitting an academic unit
☐ Termination of an academic program or unit
☐ Suspension or reactivation an academic program or unit

For proposals to establish a new center or institute, contact the Research Office (737-3437).

For requests to offer existing certificate and degree programs at new locations, use the New Location Request Form available on the Web: http://www.ous.edu/aca/aca-forms.html

Title of Proposal: Graduate Degrees in Environmental Engineering

Effective Date: 6/1/12

Department/Program: Chemical, Biological and Environmental Engineering (CBEE)

College: Engineering

I certify that the above proposal has been reviewed and approved by the appropriate Department and College committees:

Gregory L. Roman
Sign (Dept Chair/Head; Director) 11/7/11

Date

Scott A. Ashford
Print (Dean of College) 11/7/11

Print (Department Chair/Head; Director)
Proposal for MS, MEng, PhD Graduate Degrees in Environmental Engineering

Executive Summary

Institution and Program

Oregon State University, School of Chemical, Biological and Environmental Engineering

Program Description

The proposed program seeks to establish discipline-specific graduate degrees in environmental engineering within the School of Chemical, Biological and Environmental Engineering (CBEE) at Oregon State University (OSU). Degrees to be offered include Master of Science (MS), Masters of Engineering (MEng), and Doctor of Philosophy (PhD). A graduate minors in Environmental Engineering will be offered. The program will be directed towards advanced studies related to traditional environmental engineering focus areas of water and wastewater treatment, industrial and hazardous wastes management, solid wastes, groundwater remediation, air pollution control, and sustainability within the built environment. Graduates will be employable environmental engineering positions within consulting firms; federal, state and local governments; and regulated industries. Graduates will and also be able to pursue further graduate education or academic positions in teaching and research.

Evidence of Need

The evidence of need is shown by the continued demand for our graduate students with an environmental engineering emphasis in the market place. The employers of our graduates for the last 10 years who graduated with either a Chemical Engineering or Civil Engineering graduate degree with an environmental engineering emphasis cover state, national and international consulting firms, governmental agencies and regulated corporations. Our graduates have consistently found employment upon graduation in professional positions.

Target Population

Students to be served include B.S./B.A. graduates in environmental, civil and chemical engineering seeking advanced education with an environmental engineering emphasis. Students without B.S./B.A. degrees in engineering can be accepted into the program by taking prescribed remedial coursework.
Proposal for a New Academic Program

Institution: Oregon State University
College/School: College of Engineering
Department/Program: School of Chemical, Biological and Environmental Engineering
CPS Tracking #: 87814
December 2011

1. Program Description
   a. Proposed Classification of Instructional Programs (CIP) number (contact your Registrar or campus Institutional Research office for this number).

   CIP # 14.1401

   Title: Environmental/Environmental Health Engineering

   Definition: A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of systems for controlling contained living environment and for monitoring and controlling factors in the external natural environment, including pollution control, waste and hazardous material disposal, health and safety protection, conservation, life support, and requirements for protection of special materials and related work environments.


   b. Brief overview (1-2 paragraphs) of the proposed program, including its disciplinary foundations and connections; program objectives; programmatic focus; degree, certificate, minor, and concentrations offered.

   The proposed program establishes discipline-specific graduate degrees in environmental engineering within the School of Chemical, Biological and Environmental Engineering (CBEE) at Oregon State University (OSU). A graduate offering with an emphasis on environmental engineering has existed in the School since its adoption in 2007 with graduate students obtaining M.S., M.Eng., or Ph.D. degree in “Chemical Engineering.” Before 2007, graduate students with an environmental engineering emphasis obtained M.S., M.Eng., or Ph.D. degrees in “Civil Engineering” through the Department of Civil, Construction and Environmental Engineering.
The national trend is for environmental engineering programs in departments and schools with chemical engineering programs to have separate graduate degrees. This separation of degrees is much less common when environmental engineering programs are housed within civil and environmental engineering departments because of the broader nature of “civil engineering” which encompasses several disciplines (structural, transportation, geotechnical and water resources engineering). There are five programs in the United States with combined chemical and environmental engineering with a single administrative unit: University of Arizona, University of California-Riverside, University of Toledo, Yale University, and Oregon State University. Of these programs, both the University of Arizona and Yale University offer discipline-specific graduate degrees in environmental engineering.

The objective of this proposal is to create discipline-specific graduate degrees which reflect the graduate curriculum requirements for environmental engineering within CBEE. Degrees to be offered include Masters of Science, Masters of Engineering, and Doctor of Philosophy. Other programs on campus will be able to offer graduate minors in Environmental Engineering. The program will be directed towards advanced studies related to the traditional environmental engineering areas of concentration: water and wastewater treatment, industrial and hazardous wastes management, solid wastes, groundwater remediation, air pollution control, and sustainability within the built environment. Graduates will be able to be employed in environmental engineering positions in consulting firms; federal, state and local governments; and regulated industries and also be able to pursue further graduate education or academic positions in teaching and research.

### MS, MENG, PhD in Environmental Engineering (CIP # 141401)

- **Degree Types:**
  - Master of Science (MS)
  - Master of Engineering (MEng)
  - Doctor of Philosophy (PhD) and Bachelor of Science (BS)
- **Program Type:** Graduate
- **Academic Home:** School of Chemical, Biological, and Environmental Engineering
- **Areas of Concentration:**
  - Air Pollution Control
  - Groundwater Remediation
  - Industrial and hazardous Wastes Management
  - Solid Wastes
  - Sustainability Within the Built Environment
  - Water and Wastewater Treatment
- **Graduate Minor:** Environmental Engineering
• Course Designator: **ENVE** (existing)
• Delivery Mode and Location: **On-Campus/OSU-Main**
• Enrollment Limitations: **None**
• Accreditation: **None**
• Proposed Effective Date: **Summer Term 2012**

c. Course of study – proposed curriculum, including course numbers, titles, and credit hours.

Graduate courses presently offered with an environmental engineering course designator (ENVE) within CBEE are listed below. Additional courses will not be required to support the proposed degrees.

ENVE 521. Water and Wastewater Characterization (4) (slash course with ENVE 421)
PREREQ: ENVE 321 or ENVE 322

ENVE 522. Environmental Engineering Design (4) (slash course with ENVE 422)
PREREQ: ENVE 421

ENVE 525. Air Pollution Control (3) (slash course with ENVE 425)
PREREQ: ENVE 321 or ENVE 322

ENVE 531. Fate and Transport of Chemicals in Environmental Systems (4) (slash course with ENVE 431)
PREREQ: (CH 123 or CH223 or CH 226H) and (CH 440 or CHE 331) and (ENVE 321 or ENVE 322) and ENVE 421

ENVE 532. Aquatic Chemistry: Natural and Engineered Systems (4)
PREREQ: CH221, CH222, CH 223 or equivalent. COREQ: ENVE 536 and/or OC 652

ENVE 534. Physical and Chemical Processes for Water Quality Control (4)
COREQ: ENVE 532

ENVE 535. Physical and Chemical Processes for Hazardous Waste Treatment (4)
COREQ: ENVE 532

ENVE 536. Aqueous Environmental Chemistry Laboratory (1)
COREQ: ENVE 532

ENVE 541. Microbial Processes in Environmental Systems (4)

ENVE 542. Microbial Process Design for Municipal and Hazardous Wastes (4)
PREREQ: ENVE 541
ENVE 554. Groundwater Remediation (4)
PREREQ: ENVE 514
ENVE 556. Sustainable Water Resources Development (3) (slash course with ENVE 456)

It is expected that ENVE 521 and ENVE 522 (both "slash" courses) will be removed from the curriculum as graduate courses during the 2011-2012 academic year, but retained in their ENVE 421 and ENVE 422 formats for the undergraduate degree.

Descriptions of the proposed degree requirements for the M.S., M.Eng., and Ph.D. degrees in environmental engineering are described in detail in Appendix 1.

d. Manner in which the program will be delivered, including program location (if offered outside of the main campus), course scheduling, and the use of technology (for both on-campus and off-campus delivery).

The program will be delivered on-campus through classroom and laboratory formats. There are no plans to offer these degrees through E-Campus.

e. Ways in which the program will seek to assure quality, access, and diversity.

The program will continue to seek to recruit students nationally and internationally. The program with its associated degrees will be advertised through traditional channels such as brochures, mailing and our website. Typically, the numbers of inquiries for graduate admission with an environmental emphasis are about one hundred per year resulting in about 20 to 30 graduate applications. About one quarter of the applications are from international students and about one half are from women. Underrepresented students are encouraged to apply for admission in all recruiting materials and all efforts are made to provide financial aid to all qualified underrepresented students. Mailing lists from the McNair Scholars Directory, the California Forums for Diversity in Graduate Education, the Society for the Advancement of Chicano and Native American Students and other appropriate sources will be used to advertise the degree offerings.

Graduate admission requirements are a B.S. or B.A. degree in engineering. Students without an engineering degree (e.g. environmental science degree) will be required to complete a set of remedial engineering courses upon entrance to the program which are described in Appendix 1.

To be admitted to the graduate degrees, students must have an undergraduate grade point average (GPA) of 3.00 (on a 4-point scale) for the last graded 90 quarter or 60 semester credit hours. The minimum GRE score is 1100 (combined verbal and quantitative). For international students, the minimum TOEFL score is 580 (or iBT of 18 on each section). GRE exams are required for all applicants except those with degrees from the College of Engineering at OSU. For Fall Term 2011 graduate admits who chose an environmental engineering area of concentration, the average GPA on
the last 90 quarter hours was 3.41; the average verbal GRE score was 595; and the average quantitative GRE score was 700.

Financial aid is presently offered to students through GTAs, GRAs, and university and school scholarships and fellowships. Nearly all of the present graduate students in the program seeking M.S. and Ph.D. degrees are at least partially funded. Students seeking M.Eng. degrees are ineligible for financial aid as this is a coursework only degree.

f. Anticipated fall term headcount and FTE enrollment over each of the next five years.

The number of graduate students in CBEE with an environmental engineering emphasis is typically from 20 to 40 persons. Presently, the student enrollment is seventeen M.S., six M.Eng., and six Ph.D. students, a total of twenty-nine. The new enrollment for Fall Term 2011 was seven M.S., two M.Eng. and no Ph.D. students. The number of M.Eng. students is expected to increase in the future because of increasing enrollment of INTO students.

g. Expected degrees/certificates produced over the next five years.

The expected number of graduates per year from the program should be about eight M.S., two to eight M.Eng., and two Ph.D. students.

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

The students to be served are primarily expected to be full-time, traditional students. The program has traditionally had a small number of part time students who are working in the Corvallis area. It is expected that the student population will be about 75% US and 25% international, although the mix will depend heavily upon the INTO enrollment.

i. Adequacy and quality of faculty delivering the program.

CBEE presently has about 20 faculty all in which have graduate status. There are seven faculty members who have a strong emphasis in environmental engineering. These seven faculty teach all of the undergraduate and graduate environmental engineering courses plus some undergraduate and graduate courses in the general CBEE curriculum. All seven faculty members have active research programs and advise graduate students with the environmental engineering area of concentration.

j. Faculty resources – full-time, part-time, adjunct.

The faculty members with an emphasis within the environmental engineering area of concentration include:
Dr. Mark Dolan. Ph.D. from Stanford University. Associate Professor. Professional emphasis includes microbial process, bioremediation, groundwater treatment, and biological wastewater treatment.

Dr. Stacy Harper. Ph.D. from Oregon State University, Assistant Professor (joint appointment with Environmental Toxicology). Professional emphasis includes environmental toxicology, fate and transport of chemicals in the environment, and toxicity of nanoparticles.

Dr. Jeff Nason. Ph.D. from University of Texas, Austin. Assistant Professor. Professional emphasis includes water treatment, particles interaction dynamics, and emerging contaminants.

Dr. Lewis Semprini. Ph.D. from Stanford University. Distinguished OSU Professor. Professional emphasis includes microbial processes, bioremediation and groundwater treatment. Serves as Executive Chair of the OSU Subsurface Biosphere Initiative.

Dr. Dorthe Wildenschild. Ph.D. from Technical University of Denmark. Associate Professor. Professional emphasis includes groundwater remediation, transport in porous media and small-scale visualization techniques.

Dr. Kenneth Williamson. Ph.D. from Stanford University. Emeritus Professor. Professional emphasis includes sustainable engineering, biological treatment, and environmental policy.

Dr. Brian Wood, Ph.D. from University of California, Davis. Full professor. Professional emphasis includes transport phenomenon, transport in porous media, and applied engineering mathematics.

All of the faculty members presently teaching in the program or advising graduate students are full-time except Dr. Williamson who is half time and Dr. Harper who has a joint appointment. There is presently no adjunct faculty members.

k. Other staff.
Dr. Mohammad Azzizian. Research Assistant Professor. Ph.D. from Oregon State University. Professional emphasis is in analytical techniques for measurement of environmental contaminants.

Dr. Azzizian teaches one graduate laboratory course and serves as manager of the environmental engineering laboratory and as an active research faculty working on several grants.

I. Facilities, library, and other resources.
Computer, teaching and research laboratories and faculty offices are presently located in Merryfield and Owen Halls. Computer services are provided through the College of Engineering and include access to graduate-level software packages for analysis and design. Graduate students are provided offices in Merryfield and Owen Halls. No changes in the needed library resources or library use are required as students with an environmental engineering emphasis are presently enrolled and the program is not expected to substantially grow by adoption of these degrees.

m. Anticipated start date.

June 1, 2012.

2. Relationship to Mission and Goals
   a. Manner in which the proposed program supports the institution’s mission and goals for access; student learning; research, and/or scholarly work; and service.

The environmental engineering degrees will support OSU’s mission and goals through education, research and service by providing graduates with expertise in environmental engineering analysis and design. These degrees will provide access for national and international students as well as OSU’s environmental, chemical and civil engineering undergraduates. OSU’s strong commitment to maintaining environmental quality and sustainability will be further enhanced by the addition of these degrees.

b. Connection of the proposed program to the institution’s strategic priorities and signature areas of focus.

The broad nature of the proposed environmental engineering degrees contributes to all of OSU’s strategic priorities including sustainable earth ecosystems, improving health and wellness, and promotion of economic growth and social progress. Technologies to maintain clean water, air and land resources are essential for all of these priorities.

c. Manner in which the proposed program contributes to Oregon University System goals for access; quality learning; knowledge creation and innovation; and economic and cultural support of Oregon and its communities.

OSU and OUS strategic goals overlap in general and the addition of the environmental engineering graduate degree will support both. Seeking to serve the citizens of Oregon, identifiable advanced education in environmental engineering will provide for optimal statewide development through lower costs and reduced environmental impacts.

d. Manner in which the program meets broad statewide needs and enhances the state’s capacity to respond effectively to social, economic, and environmental challenges and opportunities.
Environmental engineering as a profession is dedicated to solving a variety of societal needs related to social, economic and environmental challenges. Oregon’s greatest 21st Century challenge will be how to provide adequate infrastructure for its population growth and economic development without sacrificing its clean water, air and land resources. The graduates with these degrees will be ideally suited to enter Oregon’s workforce and provide leadership, expertise and innovation for the tasks at hand.

3. Accreditation

a. Accrediting body or professional society that has established standards in the area in which the program lies, if applicable.

There are no plans to accredit the graduate degrees in environmental engineering.

b. Ability of the program to meet professional accreditation standards. If the program does not or cannot meet those standards, the proposal should identify the area(s) in which it is deficient and indicate steps needed to qualify the program for accreditation and date by which it would be expected to be fully accredited.

Not applicable.

c. If the proposed program is a graduate program in which the institution offers an undergraduate program, proposal should identify whether or not the undergraduate program is accredited and, if not, what would be required to qualify it for accreditation.

The undergraduate program in environmental engineering is accredited by the Accrediting Board of Engineering and Technology (ABET).

d. If accreditation is a goal, the proposal should identify the steps being taken to achieve accreditation. If the program is not seeking accreditation, the proposal should indicate why it is not.

Accreditation of the degrees is not a goal. ABET does not allow accreditation of undergraduate and graduate degrees at the same institution in the same program.

4. Need
a. Evidence of market demand.

Taken from the American Academy of Environmental Engineers’s website, the market demand for environmental engineers is described as:

“The area commonly described as environmental protection or management is very broad. However, the large majority of people employed in this general career area are scientists and engineers.

Environmental engineering training offers you opportunities to work in any aspect of environmental protection. The major areas include air pollution control, industrial hygiene, radiation protection, hazardous waste management, toxic materials control, water supply, wastewater management, storm water management, solid waste disposal, public health, and land management. And, within each of these major categories are many sub-specialties.

Environmental engineering provides limitless opportunities as to type of work, for whom you work, and where you work. A career in environmental engineering provides a comfortable salary, job security, and considerable personal satisfaction.

- **Competitive salaries** --- As the 1990’s drew to a close, B.S. degree engineers were receiving starting salaries ranging from $36-$42,000 with some as much as $48,000; with a Masters degree, $40-$45,000; and with a Ph.D., $42-$50,000. A licensed engineer (it takes a minimum of four years of post B.S. degree experience to qualify) with five years experience can expect to earn $50-$60,000. ..... Along with salary come the standard fringe benefits of vacation, insurance, etc.

- **Job security** --- Since before the turn of this century, there have always been many more jobs than environmental engineers to fill them. So, you will never be out of work.”
The best evidence of market demand is the continued demand for our graduate students with an environmental engineering area of concentration in the market place. The employers of our graduates for the last 10 years who graduated with either a Chemical Engineering or Civil Engineering graduate degree with an environmental engineering area of concentration are shown in Appendix 2. Our graduates have always found excellent opportunities in the field both nationally and internationally.

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

Not applicable.

c. Manner in which the program would serve the need for improved educational attainment in the region and state.

There is a continued demand for environmental engineers in both Oregon and the Pacific Northwest. In the past, our graduates have filled many of these positions in both private consulting, governmental agencies and regulated industries.

d. Manner in which the program would address the civic and cultural demands of citizenship.

Graduate students with advanced degrees in environmental engineering will have a unique professional expertise which will support their civic lives through a greater knowledge base for personal, local and statewide decisions related to environmental quality. Such civic issues (i.e. climate change) continue to become increasing complex and technical and desperately call for informed technical input. Graduates in environmental engineering will be able to be important contributors as society seeks to find optimal solutions to a wide variety of environmental problems and their associated management.

Outcomes and Quality Assessment

a. Expected learning outcomes of the program.

The learning outcomes and the proposed assessment methods are listed below for each proposed degree.
Evaluated Graduate Learning Objectives/Outcomes for Ph.D., M.S., and M.Eng. Programs
Environmental Engineering, College of Engineering

<table>
<thead>
<tr>
<th>Ph.D. Outcomes</th>
<th>MS Outcomes</th>
<th>MEng Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome 1: Scholarship</strong> The student will be able to identify and conduct original research resulting in a significant contribution to knowledge in the fields spanned by Chemical, Biological and Environmental Engineering (CBEE) and to effectively communicate this work to a technically literate audience. This will be assessed using the Ph.D. Qualifier Examination, Ph.D. Thesis and Final Oral Examination (“Defense”).</td>
<td><strong>Outcome 1: Scholarship</strong> The student will be able to conduct original research and assemble a creative new body of work in the fields spanned by CBEE and to effectively communicate this work to a technically literate audience. This will be assessed using the M.S. Thesis and Final Oral Examination.</td>
<td><strong>Outcome 1: Scholarship</strong> The student will be able to assemble a presentation synthesizing aspects of core knowledge in the fields spanned by CBEE and to effectively communicate this work to a technically literate audience. This will be assessed using the M.Eng. Final Oral Examination.</td>
</tr>
<tr>
<td><strong>Outcome 2: Mastery of Subject Material</strong> The student will be able to think critically, creatively and to address technical problems in the fields spanned by CBEE. This will be assessed through satisfactory completion of the graduate program of study, as well as course summaries written by the instructors.</td>
<td><strong>Outcome 2: Mastery of Subject Material</strong> The student will be able to think critically, creatively and to address technical problems in the fields spanned by CBEE. This will be assessed through satisfactory completion of the graduate program of study, as well as course summaries written by the instructors.</td>
<td><strong>Outcome 2: Mastery of Subject Material</strong> The student will be able to think critically, creatively and to address technical problems in the fields spanned by CBEE. This will be assessed through satisfactory completion of the graduate program of study, as well as course summaries written by the instructors.</td>
</tr>
<tr>
<td><strong>Outcome 3: Ethical Conduct</strong> Students will be educated in ethical and responsible conduct in research and professional activities. This will be assessed through satisfactory completion of the graduate seminar (CHE507), as well as ethical completion of the Ph.D. Qualifier Examination and the Ph.D. Thesis and Final Oral Examination.</td>
<td><strong>Outcome 3: Ethical Conduct</strong> Students will be educated in ethical and responsible conduct in research and professional activities. This will be assessed through satisfactory completion of the graduate seminar (CHE507), as well as ethical completion of the M.S. Thesis and Final Oral Examination.</td>
<td><strong>Outcome 3: Ethical Conduct</strong> Students will be educated in ethical and responsible conduct in professional activities. This will be assessed through satisfactory completion of the graduate seminar (CHE507), as well as ethical completion of the M.Eng. Final Oral Examination.</td>
</tr>
</tbody>
</table>
b. Methods by which the learning outcomes will be assessed and used to improve curriculum and instruction.

A mapping of the assessment method for each degree is shown below.

Ph.D. degree:

**Mapping Guide for the Ph.D. Degree – Environmental Engineering**

The main activities are listed for each outcome. Other activities may also support the outcomes, but data will be collected for those listed using the described method.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Learning Outcomes and Evidence: Graduate students in the Ph.D. program will demonstrate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Outcome 1:</strong> Scholarship</td>
</tr>
<tr>
<td></td>
<td>Identify and conduct original research, scholarship or creative endeavors; communicate</td>
</tr>
<tr>
<td></td>
<td>with peers</td>
</tr>
<tr>
<td></td>
<td><strong>Outcome 2:</strong> Mastery of Subject Field</td>
</tr>
<tr>
<td></td>
<td>The student will be able to think critically,</td>
</tr>
<tr>
<td></td>
<td>creatively and to address technical problems in field</td>
</tr>
<tr>
<td></td>
<td><strong>Outcome 3:</strong> Ethical Conduct</td>
</tr>
<tr>
<td></td>
<td>Conduct professional activities in an ethical and responsible manner</td>
</tr>
<tr>
<td>1. Completion of Coursework</td>
<td>Completion of Program of Study; Course Summaries for Core Courses in ENVE program (ENVE 531, ENVE 532, ENVE 534, ENVE 536 and ENVE 541)</td>
</tr>
<tr>
<td>2. Seminar Series</td>
<td></td>
</tr>
<tr>
<td>3. Ph.D. Qualifier Exam</td>
<td>Filled individual examiner’s rubrics and committee summary rubric</td>
</tr>
<tr>
<td>4. Ph.D. Thesis and Final Oral Exam</td>
<td>Filled individual examiner’s rubrics and committee summary rubric</td>
</tr>
</tbody>
</table>
### M.S. degree:

**Mapping Guide for the M.S. Degree – Environmental Engineering**

The main activities are listed for each outcome. Other activities may also support the outcomes, but data will be collected for those listed using the described method.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Learning Outcomes and Evidence: Graduate students in the M.S. program will demonstrate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome 1: Scholarship</strong></td>
<td>Identify and conduct original research, scholarship or creative endeavors; communicate with peers</td>
</tr>
<tr>
<td><strong>Outcome 2: Mastery of Subject Field</strong></td>
<td>The student will be able to think critically, creatively and to address technical problems in field</td>
</tr>
<tr>
<td><strong>Outcome 3: Ethical Conduct</strong></td>
<td>Conduct professional activities in an ethical and responsible manner</td>
</tr>
</tbody>
</table>

1. **Completion of Coursework**
   - Completion of Program of Study; Course Summaries for Core Courses in ENVE program (ENVE 531, ENVE 532, ENVE 534, ENVE 536 and ENVE 541)

2. **Seminar Series**
   - Completion of Program of Study showing participation in CHE 507 seminar

3. **M.S. Thesis and Final Oral Exam**
   - Filled individual examiner’s rubrics and committee summary rubric

### M.Eng. degree:

**Mapping Guide for the M.Eng. Degree – Environmental Engineering**

The main activities are listed for each outcome. Other activities may also support the outcomes, but data will be collected for those listed using the described method.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Learning Outcomes and Evidence: Graduate students in the M.Eng. program will demonstrate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome 1: Scholarship</strong></td>
<td>Conduct literature research on a CBEE related process and assemble an oral presentation summarizing the process; communicate with peers</td>
</tr>
<tr>
<td><strong>Outcome 2: Mastery of Subject Field</strong></td>
<td>The student will be able to think critically, creatively and to address technical problems in field</td>
</tr>
<tr>
<td><strong>Outcome 3: Ethical Conduct</strong></td>
<td>Conduct professional activities in an ethical and responsible manner</td>
</tr>
<tr>
<td>1. Completion of Coursework</td>
<td>Completion of Program of Study; Course Summaries for Core Courses in ENVE program (ENVE 531, ENVE 532, ENVE 534, ENVE 536 and ENVE 541)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>2. Seminar Series</td>
<td>Completion of Program of Study showing participation in CHE 507 seminar</td>
</tr>
<tr>
<td>3. Final Oral Exam</td>
<td>Filled individual examiner’s rubrics and committee summary rubric</td>
</tr>
<tr>
<td></td>
<td>Filled individual examiner’s rubrics and committee summary rubric</td>
</tr>
</tbody>
</table>
c. Program performance indicators, including prospects for success of program graduates (employment or graduate school) and consideration of licensure, if appropriate.

Various performance indicators will be collected including:

- Number of applicants, offers and acceptance rates
- Academic qualifications of applicants and accepted students
- Retention and graduation rates
- Employment upon graduation
- Student satisfaction from exit interviews
- Employer satisfaction

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

All faculty members who identify with the environmental engineering graduate program are active in research including funded projects. For the six faculty listed in Section 1, the present research funding is about $2 million per year. The scholarly publication rate for these faculty combined is about 15 to 20 refereed journal articles per year. Performance parameters continually collected by the College of Engineering include:

- Scholarly publication
- Participation in professional meetings, conferences and workshops
- External funding for research
- Number and magnitude of proposals written
- Participation in professional societies, committees, boards, and commissions
- Commercial development including disclosures, patents and start-up companies

These indicators are evaluated each year in the faculty member’s annual review.

6. Program Integration and Collaboration

a. Closely related programs in other OUS universities and Oregon private institutions.

There is a graduate program at Portland State University which offers M.S., M.Eng. and Ph.D. degrees in Civil and Environmental Engineering; there is also a graduate program at the Oregon Health and Science University/Oregon Graduate Institute (OSHU/OGI) which offers M.S. and Ph.D. degrees in Environmental Science and 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.
The proposed graduate degrees in environmental engineering complement both the PSU and OHSU/OGI offerings. The PSU program in environmental engineering is strongly focused upon water quantity and quality issues, similar to the Water Resources Engineering degrees offered by the OSU Graduate School. The OGI program in environmental science and engineering is strongly focused upon biogeochemical processes and groundwater remediation. Neither of these programs have a strong emphasis upon traditional environmental engineering focus areas in the built environment.

The faculty members within CBEE have collaborated in the past with both the PSU and OGI programs. Joint proposals and projects have been conducted with both programs and the OSU environmental engineering faculty members have had substantial interaction with PSU faculty around the establishment of Oregon’s Built Environment and Sustainable Technologies (BEST) Signature Research Center. Future collaborations are expected as appropriate.

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

d. Potential impacts on other programs in the areas of budget, enrollment, faculty workload, and facilities use.
No impact on other programs is expected.

7. **Financial Sustainability** (attach the completed *Budget Outline*)
a. Business plan for the program that anticipates and provides for its long-term financial viability, addressing anticipated sources of funds, the ability to recruit and retain faculty, and plans for assuring adequate library support over the long term.

The support of these graduate degrees is part of the College of Engineering's present budget and future strategic plan. No changes to present plans for financial viability, funding, recruitment of faculty or library support are expected (see Table 1).

b. Plans for development and maintenance of unique resources (buildings, laboratories, technology) necessary to offer a quality program in this field.

The research programs associated with the proposed degree are located in Merryfield and Owen Halls and are funded by support to CBEE and the on-going research program. The present estimated costs for the graduate program for an environmental engineering area of concentration are about $1 million per year including state support and external research grants and contracts (Table 2 which is in a file in additional materials). We have listed an added cost in future years of approximately $2000 per year for new brochures and changes to the webpage.

c. Targeted student/faculty ratio (student FTE divided by faculty FTE).

The COE strategic plan sets expectations of 3 M.Eng./M.S. students and 4 Ph.D. students per research active faculty by 2025. This would put the total graduate enrollment for the three degrees at about 40 to 50 students.

d. Resources to be devoted to student recruitment.

Present resources for student recruitment include the costs of brochures, mailing, and webpage maintenance. This commitment of resources is expected to continue in the future and will be supplemented with small funding (~$2,000 per year, inflated by 2.5% per year) as mentioned above.

8. External Review (if the proposed program is a graduate level program, follow the guidelines provided in External Review of new Graduate Level Academic Programs in addition to completing all of the above information)

The proposed external reviews of this program include:

Dr. John Ferguson
Professor
Department of Civil and Environmental Engineering
University of Washington  
304 More Hall  
Box 352700  
Seattle, WA  

jferg@u.washington.edu  
(206) 543-5176

Dr. James Hunt  
Lawrence E. Peirano Professor of Civil and Environmental Engineering  
University of California, Berkeley  
625 Davis Hall  
Berkeley, CA 94720-5800  

hunt@ce.berkeley.edu  
(510) 642-0948

Dr. Richard Watts  
Professor  
Department of Civil and Environmental Engineering  
Washington State Univeristy  
PO Box 642910  
Pullman, WA  99164-2910  

Riwatts@wsu.edu  
(509) 335-7632

Dr. Erik Coats  
Assistant Professor  
Department of Civil Engineering  
PO Box 441022  
Moscow, Idaho  83844-1022  

ecoats@uidaho.edu  
(208) 895-7559

Dr. Jeannie Darby  
Professor  
Department of Civil and Environmental Engineering  
University of California at Davis  
One Shields Avenue  
Davis, CA  95616  

jdarby@ucdavis.edu  
(530) 752-5670
To: Kenneth Williamson

From: Alex Yokochi, Chair of Graduate Committee

Subject: Proposed Environmental Engineering Graduate Degree

The Graduate Committee in CBEE fully supports the proposal addition of M.Eng., M.S., and Ph.D. degrees in environmental engineering within the School. These degrees will provide a clearer distinction between the environmental and chemical engineering graduates. The offerings of degrees in chemical and environmental engineering will assist the Graduate Committee in both attracting excellent students nationally and internationally and in advising graduate students within the School related to required coursework.
To: Kenneth Williamson

From: Milo Koretsky, Chair of the Curriculum Committee, School of Chemical, Biological, and Environmental Engineering

The Curriculum Committee in the School of Chemical, Biological, and Environmental Engineering is supportive of the offering of M.Eng., M.S., and Ph.D. degrees in environmental engineering. This proposal requires no new courses or curricular changes from our present offerings.

Milo Koretsky
Professor
School of Chemical, Biological, and Environmental Engineering
103 Gleeson Hall
Oregon State University
Corvallis, OR 97331-2702
v (541) 737-4591
f (541) 737-4600
milo.koretsky@oregonstate.edu
http://cbee.oregonstate.edu/education/
December 5, 2011

Professor Kenneth J. Williamson  
School of Chemical, Biological and Environmental Engineering  
Oregon State University  
102 Gleeson Hall  
Corvallis, OR 97331-2702

Dear Dr. Williamson:

I am writing in support of the addition of Environmental Engineering to the graduate degrees offered at Oregon State University. As the Chief Operating Officer (COO) of Bend Research Inc., I know first-hand of the importance of this type of expertise and the demand that exists for graduates with this type of degree.

By way of introduction, Bend Research is a private research, development, and manufacturing company focused on the advancement of our clients’ best new medicines. We provide pharmaceutical formulation and dosage-form support, assist in process development and optimization, manufacture clinical trial quantities of drug candidates in our current Good Manufacturing Practice (cGMP) facility, and advance promising drug candidates from conception to commercialization. Bend Research has more than 240 employees based in four state-of-the-art facilities in Bend, Oregon, USA.

Given the size and scope of the work we perform, environmental engineering plays a key role in our work, in terms of experimental design, process design, waste mitigation, and waste treatment, as well as figuring significantly into our Environmental Health and Safety (EH&S) procedures.

At Bend Research, we view our role as a good corporate citizen as an important one, so having access to employees who can help us enhance sustainability and mitigate the environmental impact of our work is vital to us. The addition of such a degree to OSU’s offering would certainly assist us in our efforts.

Sincerely,

Lisa J. Graham, Ph.D., P.E.
Category I Proposal
Guidelines for Addressing Accessibility of New Programs

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 prohibits discrimination against individuals with disabilities and mandates the provision of reasonable accommodations to ensure access to programs and services. Oregon State University is committed to providing equal opportunity to higher education for academically qualified students without regard to a disability.

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: Graduate Degree in Environmental Engineering

Effective Date: 6/1/12

Department/Program: Chemical, Biological and Environmental Engineering (CBEE)

College: Engineering (COE)

☑ Faculty Guidelines (http://ds.oregonstate.edu/facultystaff.aspx?Title=ResponsibilitiesFacultyStaff)
☑ Information Technology Guidelines (http://oregonstate.edu/accessibility/)

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

Gregory L. Rorrer
Sign (Dept Chair/Head; Director) 11/7/11
Date

Gregory L. Rorrer
Print (Department Chair/Head; Director)
Library Evaluation for Category I Proposal

MEng, MS and PhD Degrees in Environmental Engineering
Title of Proposal

Chemical, Biological & Ecological Engineering
Department

Engineering
College

The subject librarian responsible for collection development in the pertinent curricular area has assessed whether the existing library collections and services can support the proposal. Based on this review, the subject librarian concludes that present collections and services are:

[ ] inadequate to support the proposal (see budget needs below)
[ ] marginally adequate to support the proposal
[x] adequate to support the proposal

Estimated funding needed to upgrade collections or services to support the proposal (details are attached)

Year 1: Ongoing (annual):

Comments and Recommendations: None.

Date Received: 11/15/11 Date Completed: 11/27/11

Margaret Mellinger
Subject Librarian

Steven Sowell
Head of Collections & Resource Sharing

Faye Chadwell
University Librarian

Signature

Signature

Signature
Oregon State University Libraries Evaluation of the Collection Supporting a Proposed Classification of Instructional Program in Environmental Engineering (M.Eng., M.S., Ph.D.)

Summary

As noted by the Category 1 Proposal “A graduate offering with an emphasis on environmental engineering has existed in the School [of Chemical, Biological and Environmental Engineering] since its adoption in 2007, with graduate students obtaining M.S., M.Eng. or Ph.D. degree in Chemical Engineering.” Additional courses will not be required to support the proposed degrees. In the past several years, OSU Libraries has been building up collections in the broad subject areas of water resources, environmental engineering, ecological engineering and sustainability. Because of this focus, and the fact that no new courses are proposed, the OSU Libraries' resources are currently adequate to support the proposed ENVE program. Students and faculty should understand that OSU Libraries collections are not as broad or deep as some of the institutions named in the Category I Proposal as having comparable programs (Yale University, the University of Arizona, and University of California, Riverside).

Monographs

A search of the OSU Libraries' Catalog revealed 857 titles classified under the subject heading “environmental engineering.” While University of Arizona and Yale University libraries hold more titles in environmental engineering, OSU students, faculty and researchers have access to over 1,000 additional environmental engineering books through the Summit consortial catalog of the Orbis/Cascade Alliance, to which OSU Libraries belong. Books requested through Summit are delivered to OSU Libraries within three to five working days. In addition, ENVE students and faculty may suggest book titles for the OSU Libraries to purchase.

Appendix A provides a brief comparison between OSU; Yale; University of California, Riverside; University of Arizona; University of Toledo; and the Summit catalog.

Serials/Journals:

Thomson Reuters' Journal Citation Reports provides impact factor metrics for the category of Environmental Engineering. Fifteen of the top 20 journals (by impact factor) in this category are held at OSU Libraries in print and/or online. OSU Libraries has current subscriptions to sixteen of the top journals in the Water Resources category. Students may find that journals they need for the graduate level curriculum in Environmental Engineering are lacking at OSU. Interlibrary Loan (ILL) can fill this gaps, but students and faculty should be aware that they need to have ILL accounts and be prepared to wait a few days for articles.

Appendix B gives listings by impact factor of the top 20 journals in the category of Environmental Engineering Appendix C gives a listing by impact factor of the top 20 journals in the Water Resources category

Electronic Access to Journals:

OSU Libraries' subscriptions to online journal packages, such as Springer, Wiley, and Elsevier have expanded electronic access and in most cases cover the years 1995 – present.
A new service from Interlibrary Loan, called Scan and Deliver, allows students, faculty and staff to order articles from the OSU Libraries print collection for online delivery.

Subject-Specific Indexes and Abstracts

OSU Libraries subscribes to the following online databases that can be useful for identifying literature in environmental engineering:

- Academic Search Premier (1975 – present)
- Compendex (1970 - present)
- Environment and Energy Publishing (2007-present)
- Environmental Sciences & Pollution Management
  - Ecology Abstracts [part of ESPM] (1982-present)
  - Environmental Engineering Abstracts [part of ESPM] (1990-present)
  - Pollution Abstracts [part of ESPM] (1981-present)
  - Sustainability Science Abstracts [part of ESPM] (1995-present)
  - Water Resources Abstracts [part of ESPM] (1967-present)
- GeoRef (1785 – present)
- Reaxys
- SciFinder Scholar (1907- present)
- Science Citation Index [Web of Science] (1965- present)

In addition to the databases listed, online handbooks and encyclopedias (CRC Handbook of Chemistry and Physics, UXL Encyclopedia of Water Science), and online standards (ASTM) may be useful for course work and research.

Library staff and expertise:

Librarian support for this program as proposed is Margaret Mellinger, the OSU Libraries liaison to the College of Engineering.

Respectfully submitted,

Margaret Mellinger, OSU Librarian

11/28/11
Appendix A: Monographs

Comparison of number of monographs: OSU and Summit and comparator institutions.

<table>
<thead>
<tr>
<th>Subject Heading</th>
<th>OSU</th>
<th>Summit (Incl. OSU)</th>
<th>Yale</th>
<th>UCR</th>
<th>Univ. Toledo</th>
<th>Univ. Arizona</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Engineering</td>
<td>857</td>
<td>1,860</td>
<td>1271</td>
<td>815</td>
<td>237</td>
<td>1412</td>
</tr>
</tbody>
</table>
### Appendix B: Environmental Engineering (ISI)

Top 20 journals by ISI Impact Factor.

<table>
<thead>
<tr>
<th>Journal Title</th>
<th>ISSN</th>
<th>Impact Factor</th>
<th>Print held at OSU</th>
<th>Online held at OSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Education Science and Technology</td>
<td>1301-8361</td>
<td>9.333</td>
<td>None</td>
<td>none</td>
</tr>
<tr>
<td>International Journal of Greenhouse Gas Control</td>
<td>1750-5836</td>
<td>4.081</td>
<td>None</td>
<td>April 01, 2007-present</td>
</tr>
<tr>
<td>International Journal of Life Cycle Assessment</td>
<td>0948-3349</td>
<td>3.148</td>
<td>None</td>
<td>1997 - present</td>
</tr>
<tr>
<td>Environmental Modelling &amp; Software</td>
<td>1364-8152</td>
<td>2.871</td>
<td>None</td>
<td>Jan. 01, 1997-present</td>
</tr>
<tr>
<td>Journal of Cleaner Production</td>
<td>0949-6526</td>
<td>2.430</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Waste Management</td>
<td>0956-053X</td>
<td>2.358</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ecological Engineering</td>
<td>0925-8574</td>
<td>2.203</td>
<td>None</td>
<td>Jan. 01, 1995-present</td>
</tr>
<tr>
<td>Indoor Air</td>
<td>0905-6947</td>
<td>2.029</td>
<td>None</td>
<td>Mar.01, 1998 - Nov.09, 2010 (embargo)</td>
</tr>
<tr>
<td>Resources Conservation and Recycling</td>
<td>0921-3449</td>
<td>1.974</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Stochastic Environmental Research &amp; Risk Assessment</td>
<td>1436-3240</td>
<td>1.777</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Environmental Geochemistry and Health</td>
<td>0269-4042</td>
<td>1.667</td>
<td>None</td>
<td>Jan. 01, 1997-Dec. 31, 2009</td>
</tr>
</tbody>
</table>
## Appendix C: Water Resources (ISI)

Top 20 journals by ISI Impact Factor.

<table>
<thead>
<tr>
<th>Journal Title</th>
<th>ISSN</th>
<th>Impact Factor</th>
<th>Print held at OSU</th>
<th>Online held at OSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrology and Earth System Sciences</td>
<td>1027-5606</td>
<td>2.463</td>
<td>None</td>
<td>1997-present</td>
</tr>
<tr>
<td>Vadose Zone Journal</td>
<td>1539-1663</td>
<td>2.133</td>
<td>None</td>
<td>Aug. 01, 2002 - present</td>
</tr>
<tr>
<td>Irrigation Science</td>
<td>0342-7188</td>
<td>2.113</td>
<td>v.2 (1980)-v.23 (2004/5)</td>
<td>Jan. 01, 1997 - Nov. 09, 2010 (embargo)</td>
</tr>
<tr>
<td>Hydrological Processes</td>
<td>0885-6087</td>
<td>2.068</td>
<td>None</td>
<td>Jan. 01, 2002 - present</td>
</tr>
<tr>
<td>Environmental Toxicology</td>
<td>1520-4081</td>
<td>1.932</td>
<td>None</td>
<td>Jan. 01, 1999 - present</td>
</tr>
<tr>
<td>Natural Hazards and Earth System Sciences</td>
<td>1561-8633</td>
<td>1.792</td>
<td>None</td>
<td>Jan. 01, 2001 - present</td>
</tr>
<tr>
<td>Stochastic Environmental Research and Risk Assessment</td>
<td>1436-3240</td>
<td>1.777</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>International Journal of Sediment Research</td>
<td>1001-6279</td>
<td>1.708</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
Faculty resources – full-time, part-time, adjunct.

The faculty members with an environmental engineering emphasis include:

Dr. Mark Dolan. Ph.D. from Stanford University. Associate Professor. Professional emphasis includes microbial process, bioremediation, groundwater treatment, and biological wastewater treatment.

Dr. Stacey Harper. Ph.D. from Oregon State University. Assistant Professor (joint appointment with EMT). Professional emphasis includes toxicity of environmental pollutants and nanoparticles, bioassay testing methods.

Dr. Jeff Nason. Ph.D. from University of Texas, Austin. Assistant Professor. Professional emphasis includes water treatment, particles interaction dynamics, and emerging contaminants.

Dr. Lewis Semprini. Ph.D. from Stanford University. Distinguished OSU Professor. Professional emphasis includes microbial processes, bioremediation and groundwater treatment. Serves as Executive Chair of the OSU Subsurface Biosphere Initiative.

Dr. Dorthe Wildenschild. Ph.D. from Technical University of Denmark. Associate Professor. Professional emphasis includes groundwater remediation, transport in porous media and small-scale visualization techniques.

Dr. Kenneth Williamson. Ph.D. from Stanford University. Emeritus Professor. Professional emphasis upon sustainable engineering, biological treatment, and environmental policy.

Dr. Brian Wood, Ph.D. from University of California, Davis. Full professor. Professional emphasis includes transport phenomenon, transport in porous media, and applied engineering mathematics.

All of the faculty members presently teaching in the program or advising graduate students are full-time except Dr. Williamson who is half time. There are presently no adjunct faculty members.

Other staff.

Dr. Mohammad Azzizian. Research Assistant Professor. Ph.D. from Oregon State University. Professional emphasis upon analytical techniques for measurement of environmental contaminants.

Dr. Azzizian teaches one graduate laboratory course and serves as manager of the environmental engineering laboratory and as an active research faculty on several grants.
Table 2. Estimated Present Expenditures for Graduate Program- Environmental Engr Area of Concentration-2011-2012
Budget Outline Form
Estimated Costs and Sources of Funds for Proposed Program

Institution: Oregon State University
Program: Chemical, Biological and Environmental Engineering
Academic Year: 2011-2012

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
<th>Column D</th>
<th>Column E</th>
<th>Column F</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Current Budgetary Unit</td>
<td>Institutional Reallocation from Other Budgetary Unit</td>
<td>From Special State Appropriation Request</td>
<td>From Federal Funds and Other Grants</td>
<td>From Fees, Sales and Other Income</td>
<td>LINE ITEM TOTAL</td>
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</tbody>
</table>

**Personnel**

<table>
<thead>
<tr>
<th>Item</th>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
<th>Column D</th>
<th>Column E</th>
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<tbody>
<tr>
<td>Faculty (Include FTE)</td>
<td>$175,000</td>
<td></td>
<td></td>
<td>$120,000</td>
<td></td>
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<tr>
<td>Graduate Assistants (Include FTE)</td>
<td>$18,500</td>
<td></td>
<td></td>
<td>$150,000</td>
<td></td>
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<tr>
<td>Support Staff (Include FTE)</td>
<td>$5,000</td>
<td></td>
<td></td>
<td>$22,000</td>
<td></td>
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<tr>
<td>Fellowships/Scholarships</td>
<td>$4,250</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>OPE</td>
<td>$61,000</td>
<td></td>
<td>$42,000</td>
<td></td>
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<tr>
<td>Nonrecurring</td>
<td></td>
<td></td>
<td>$45,000 (student workers)</td>
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Personnel Subtotal

<table>
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<th>Other Resources</th>
<th>Column A</th>
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<th>Column C</th>
<th>Column D</th>
<th>Column E</th>
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<tbody>
<tr>
<td>Library/Printed</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Library/Electronic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies and Services</td>
<td>$14,000</td>
<td></td>
<td>$184,000</td>
<td></td>
<td></td>
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<tr>
<td>Equipment</td>
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<td>Other Expenses</td>
<td></td>
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</tbody>
</table>

Other Resources Subtotal

<table>
<thead>
<tr>
<th>Physical Facilities</th>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
<th>Column D</th>
<th>Column E</th>
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</thead>
<tbody>
<tr>
<td>Construction</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Major Renovation</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Other Expenses</td>
<td></td>
<td></td>
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Physical Facilities Subtotal

**GRAND TOTAL**

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
<th>Column D</th>
<th>Column E</th>
<th>Column F</th>
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<tbody>
<tr>
<td>$277,750</td>
<td></td>
<td></td>
<td></td>
<td>$521,000</td>
<td></td>
</tr>
</tbody>
</table>
Grad | LFM Name | Degree | Current Position
---|---------|--------|------------------
200302 | Bennett, Jodie Louise | MS | PE, HED Engineering Inc. Portland
201103 | Berggren, Dusty Rose Verna | MS | CH2M Hill Corvallis
201103 | Bertrand, Danielle | MS | MWH Americas, Sacramento
200901 | Boberfeld, Christina Elaine | MS | Engineer, Goldie Arthur Associates, Tucson, AZ
201002 | Bloomsquist, Donald James | MS | Assoc. Environmental Eng., MWH, Bremerton, CO
200803 | Brown, Shane Adam | PHD | Assoc. Prof. in Engineering Educ., Washington State Univ.
200301 | Camao, La Marsha | MS | Maine NEMO Coordinator (Nonpoint Education for Municipal officers)
201003 | Cantalou, Michael George | MS | Working for Contractor at the Hanford Site
200103 | Cauce, Bonni-May | MS | Environmental Eng., Georgia Environmental Protection Division, Watershed Protection Branch
199703 | Chang, Soon Young | MS | Korean Society of Environmental Engineers
199801 | Chang, Soon Young | PHD | Korean Society of Environmental Engineers
200302 | Chaves, Gregory Daniel | MS | City of Portland Bureau of Environmental Svcs.
200000 | Chu, Min-Ying | MS | PHD Stanford - Sr. Assoc at ENVIRON Intl Corp.
200000 | Colomb, Neil Thomas | MS | Assoc. Engineer, Kjeldsen, Sinneck & Needick Inc./Sr. Engineer, Stantec
200203 | Comer, Stephanie | PHD | Research Associate, California Institute of Technology
199703 | Curtis, Beverly Jane | MS | Silvexons, Albion
200302 | Davis, Brian Michael | PHD | PE, PI, for Environmental Scientist, Metropolitan Council, MN
199802 | Degher, Alexandra Burns | MS | Worldwide Hardware LCO and FEO Program Manager, HP, Portland
200103 | Degher, Alexandra Burns | PHD | Worldwide Hardware LCO and FEO Program Manager, HP, Portland
200603 | Dewis, Kylee | MENG | Water Quality Specialist, HDR Engineering, WA
200302 | Dyjoman, Diane | MS | WaterFlick
200101 | Dover, Thomas Wayne | MS | Director Mid-Atlantic Technology, Research & Innovation Center, Bayer.
200403 | Fartung, Kevin T | MS | Engineer at KJ Environmental Management Inc.
200303 | Fenton, Levi Michael | MS | Environmental Eng., Kennedy/Jenks Consultants, Portland
200802 | Gock, Tyson L | MENG | Staff Engineer, GeoTrans Inc., Phoenix, AZ
201007 | Gobbo, Jeffrey Dean | MS | Unemployed
199602 | Goutthapi, Sarayu | MS | (Voramachantri) Lead - Web Technology at SuperMedia
200801 | Grom, Natalie | MS | PE, VP at MultiTech Engineering Services Inc., Salem, OR
200704 | Gutierrez, Blanca | MS | LEED & Sustainable Site Consultant, Baltimore, MD
200105 | Harrington, Stephanie Jeanelle | MS | Sr. Environmental Scientist, Cambria Science and Communication, Santa Barbara
200103 | Hatfield, Stephanie Jeanelle | PHD | Water Resources facilitation, assessment, education, advising and program development/implementation
200301 | Haubrich, Lance Thomas | MS | GIS Specialist/Civil Engineer, US Forest Service
200300 | Jean-Claude, Marie-Alejandra | MS | Technical Contact Water Sector System Upgrades, US Forest Service
200401 | Januah, Danielle Patricia | MS | PNSI
200402 | Jenny, Ju Yong | MS | Contractor Hanford Site
199902 | Jhunjhunwala, Paridhi | MS | Technology Assessment and Resource Recovery, Westpoint Wastewater Treatment Facility, Seattle
199703 | Johnson, Kent Arthur | MS | Manager atEngineered Process Solutions, Portland
200103 | Jones-Stanley, Branden | MENG | CH2M HILL
199902 | Kaeling, Matthew Thomas | MS | Central Coast Regional Water Quality Control Board, State of California
200400 | Keegley, Laura Jean | MS | (Farthing) Engineer Water & Electric Board
199701 | Kim, Young | MS | Director of Research and Business and Professor of Environmental Engineering at Korea University
200102 | Kim, Young | PHD | Director of Research and Business and Professor of Environmental Engineering at Korea University
201101 | Lambert, Adam L | MS | PhD Student with Wood
201103 | Larcher, Ellen Grace | PHD | Post-doc at Montana State
200907 | Lee, Jae-Hyuk | PHD | Unknown
201006 | Lee, Jae-Hyuk | MS | Unknown
200907 | Lee, Jason | MS | Unknown
200908 | Li, Jun | MS | PhD/OSC Chemistry, Research Asso (Post Doc) OSC
200103 | Lin, Hye Kyung | MS | Saramento, Married to Jae-Hyuk
200102 |Lotrario, Joseph Bryce | PHD | Unknown
200000 | Louis, Erka Nana | MS | Process Engineer, CH2M Hill
201002 | Maguire, Ian Richard | MS | Environmental Engineer, Ash Creek Associates, Portland
200303 | Manohar, Sanjay | MS | Civil Engineer
200203 | Martinez-Prado, Maria Adriana | PHD | Teacher/Researcher, Dept of Chemical Engineering, Institute of Technology in Durango, Mexico
200303 | Mathes, Kristen Elizabeth | MENG | Assoc. Engineer, CH2M Hill
200303 | Mathias, Lauren Anne | MS | Research Engineer, Office of Water Programs, California State University
200301 | Mc Kane, Shawn Michael | MS | Environmental Engineer, Washington State Department of Ecology
200402 | Michalka, Mandy Marie | PHD | Engineering Consultant, Hart Crowser, Seattle, WA
200402 | Michalka, Mandy Marie | MS | Engineering Consultant, Hart Crowser, Seattle, WA
201103 | Mustian, Nizer | PHD | Post Doc, University of Washington
200300 | Noli, Carmen Etienne | MS | Black and Veatch, Lake Oswego, OR
200200 | Oatlahophan, Khommarath | PHD | Lecturer, Dept of Environmental Engineering, Chulalongkorn University
200103 | Oatlahophan, Khommarath | MS | Restoration Development Branch, National Facilities Engineering Service Center
200606 | Peveer, Richard | MENG | Project Manager, Ansessors and White Consulting, Sacramento, CA
200402 | Pun, Gary Wei-Hsiung | PHD | Biomediaion & Irrationality Center, Innovative Engineering Solutions Inc.
200600 | Puri, Carin | MS | Clinical Assistant Professor, Dept. of Civil and EnvE, Washington State University
199901 | Robertson, Cassandra Lee | MS | Local song writer and Performer
200002 | Rogers, Derek Stephen | MS | Consulting Firm, Arizona
200103 | Rungkamol, Darin | MS | Consulting Firm, Thailand
200101 | Saxthoff, Robert Kenneth | MS | Hewlett Packard, Corvallis
200300 | Suhardistyoe, Andrew | PHD | Post Doc, Montana State
200500 | Suriyapad, Sivadhoti | MS | Seeking PhD in Radiation Health Physics at OSU
200103 | Saini, Gaurav | MS | Postdoctoral Researcher, University of Delaware
201003 | Saini, Gaurav | PHD | Postdoctoral Researcher, University of Delaware
201303 | Sandhbergh, Sean Christopher | PHD | Project Manager at Loca Technologies
200903 | Sann, Toshihiko | MENG | Nihon Parkeirting Co. Ltd., Japan
200403 | Satayawat, Chakkrit | MS | Ph.D Illinois Institute,E.I.T., Research Asso., Illinois Institute of Technology
201001 | Satterle, Morgan Ann | MENG | CH2M Hill, Corvallis
200402 | Schrob, Kristen E | MS | Unknown
200401 | Shangguanhan, Sarayavanan | MS | Project Engineer, The Source Group, Los Angeles, CA
200404 | Shen, Jie Huan | MS | Consulting Firm, Corvallis
201002 | Spreck, Matthew Scott | MS | Chief Operating Officer, Pacific NW Publishing, Eugene, OR
201002 | Spreck, Matthew Scott | MS | Unemployed (7/8/11)
200404 | Smoother, Matthew Aaron | MS | Civil Engineer, City of Springfield Public Works, OR
200301 | Smith, Paul | MS | PE, Assoc. Environmental Eng., AECOM Earth and Environmental Inc., Portland, OR
200901 | Taylor, Anne Elizabeth | PHD | Postdoctoral Researcher, OSU Crop and Soil Science
200400 | Tjasa, Jun | PHD | Assoc. Professor, Urban Hydrology, Environmental Engineering, Chulalongkorn University, India
200301 | Thompson, Robert Everett | MS | Thompson & Co. Inc. Civil Contractors
200200 | Timmins, Brian Hales | MS | Director, Environmental Technologies LLC, Portland
199900 | Tumbare, Ajitmaje | MS | Deceased 12/20/2000
200000 | Vachekornvan, Sanjay | MS | Client Account Manager, CH2M Hill, Santa Ana, CA
200403 | Vassaila, Chaitanya Rohit | MS | MWH Americas, Bend, OR
200103 | Wright, Scott Alan | MS | PhD in Elec at Univ, Michigan, Co-Founder and Director of the Board of Globe Shavers
200104 | Xie, Zhihua | MS | Senior Engineer, CAI Consultants Inc, Orlando, FL
200402 | Xue, Unta | PHD | Head Researcher, Korean Ministry of Environment ?
200402 | Zentner, Matthew Aron | MS | Ph.D & OCE Geosciences (Geography) 2010, Hydrodreg, US Dept of Defense
Appendix 1

Program Requirements for MEng, MS and PhD Degrees in Environmental Engineering
Oregon State University
MEng Degree Program in Environmental Engineering

Program Philosophy

The Master of Engineering (MEng) degree provides students with the option of obtaining a Master’s-level degree, but without the research component requirement associated with the traditional Master of Science degree (MS).

The MEng is a coursework-only Master’s degree of 45 credits based on curricula that allow graduate students to efficiently focus on the academic courses that are most relevant to their professional objectives. The specific learning outcomes for this degree differ from those of the MS program, because MEng students will not be required to learn research methods or to conduct independent research. Rather, the emphasis is on acquiring specific job-related knowledge and skills as currently presented in existing graduate level courses.

The MEng is now offered because professional engineering societies and industry are calling for a Master’s degree as the entry-level engineering degree. Furthermore, many graduate students are interested in pursuing more advanced studies in specialized areas, but a career in research is not their professional goal. For part-time students, the MEng program can be more feasible and attractive than an MS program due to the lack of a thesis or project requirement. Thus, the MEng offers these students a viable alternative to the MS degree.

1.1 MEng Thesis Requirement

The MEng degree in Environmental Engineering does not have a Thesis requirement.

1.2 Minimum Academic Requirements for the MEng Degree

The MEng degree is intended for students who wish to pursue a “coursework only” graduate degree in Environmental Engineering. The MEng degree program requires a minimum of 45 credit hours in graduate-level coursework. This includes 21 credits in the Major field (Environmental Engineering), 15 credits in the Minor field, and an additional 9 credits of approved coursework. If a minor is declared, the student’s advisory committee must include a faculty member from the minor department. Approximately two-thirds of the work (30 graduate credits) should be listed in the major field and one third (15 graduate credits) in the minor field. The program of study is developed under the guidance of the major professor and minor professor, when a minor is included, and signed by those professors and chair of the academic unit before filing in the Graduate School. Credit hours used in one Master's Program Form may not be used in an additional Master's Program Form for another degree.

All MEng degree students must earn a cumulative 3.00 GPA for courses listed in their graduate program of study. Any course in their graduate program of study with a grade of C- or lower must be repeated. They must also maintain a cumulative 3.00 GPA for all courses taken at OSU as a graduate student.

1.3 Residence Requirements
After admission to the graduate program, 30 OSU graduate credits as a degree-seeking graduate student are required in residence. Unless on approved Leave of Absence, all graduate students in graduate programs must register continuously for a minimum of 3 graduate credits, excluding summer session, until their degree is granted.

1.4 Registration Requirements

Full-time status as a graduate student is defined by Oregon University System (OUS) as enrollment in 9 credits per term.

1.5 Graduate Study Program

A MEng degree student is required to file a program of study with the Graduate School before completing 18 hours of graduate credit. A student who does not file a program of study within the specified deadline will not be allowed to register for the next term.

1.6 Time Limit

All work toward a MEng degree must be completed within 7 years.

1.7 Final Oral Examination

The MEng degree requires a comprehensive Final Oral Examination. The student will arrange a time that is acceptable for all committee members, and then schedule a two-hour exam through the Graduate School. The exam will consist of a 30 minute presentation prepared and delivered by the candidate that provides a meaningful evaluation and reflection on experiences gained in coursework completed toward the degree, followed by questions from the committee on the candidate’s presentation and knowledge gained from the candidate’s coursework. The 30 minute presentation should highlight the following items:

1. A statement of the candidate’s professional goals for obtaining the MEng degree.

2. An overview on how the MEng coursework, including both Major and Minor areas, provided the preparation needed to achieve the candidate’s professional goals.

3. A highlight of examples from class projects, homework, job search efforts, etc. that illustrate and elaborate on Item 2.

The MEng candidate must also provide a two-page MEng Coursework Program Summary Statement that highlights items 1 to 3 above, to be handed in at the beginning of the Final Oral Examination.

2. Course Requirements

2.1 Major Courses (21 credits)
The Environmental Engineering Program offers the following core courses which must be taken for graduate credit for the major in Environmental Engineering.

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For all new graduate students, the enrollment in Seminar (ENVE 507) is required for the first academic year (F, W, S). Attendance in the ENVE 507 Seminar is required for all graduate students.

A M.Eng. candidate without a B.S. degree in Environmental Engineering (or equivalent Engineering degree) must take the following courses in addition to the ENVE core:

- **Pre-requisite courses** (completion required before taking ENVE core courses)
  - Math through Differential Equations
  - One year of General Chemistry
  - One year of Physics
  - CBEE 211 (3) Material Balances and Stoichiometry
  - ENVE 322 (4) Fundamentals of Environmental Engineering

- **Co-requisite courses**
  - ENVE 421 (4) Water and Wastewater Characterization
  - ENVE 422 (4) Environmental Engineering Design
  - CE 547 (4) Water Resources Engineering I: Principles of Fluid Mechanics

### 2.2 Minor Courses (15 credits)

A graduate minor is an academic area that clearly supports the major. Neither the Graduate School nor the School of CBEE require a student to pursue an academic minor outside of their major area of study. If a minor is desired, the minor can be one of several choices:

1. the same academic area as the major with a different area of concentration,
2. an academic area available only as a minor (from another program at OSU),
3. a different major,
4. an approved major at another institution in the OUS,
5. an integrated minor.

Students pursuing a minor will need a Minor Professor to oversee the completion of their academic minor. For option (1) above, the Minor Professor is an ENVE faculty member. For options (2-5), the Minor Professor would be chosen from graduate faculty in the academic area of interest. Option (4), an integrated minor, consists of a series of cognate courses from two or more academic areas outside the major area of concentration (limit of one ENVE course in an integrated minor). The Minor Professor for an integrated minor must be from outside the ENVE program and represent (at least one of) the academic area(s) of interest.
A list of courses offered by the Environmental Engineering Program that are often part of a minor in same academic area as the major, but with a different area of concentration, are:

- ENVE 525 (3) Air Pollution Control
- ENVE 531 (4) Fate and Transport of Chemicals in Environmental Systems
- ENVE 542 (4) Microbial Process Design for Municipal and Hazardous Wastes
- ENVE 554 (4) Groundwater Remediation
- ENVE 556 (3) Sustainable Water Resources Development
- ENVE 599 Selected Topics
- ENVE 505 Reading and Conference

Reading and Conference, ENVE 505, is used only occasionally and may be taken as a minor ENVE course but is handled on a case-by-case basis with a faculty member willing to act as instructor for the course. No more than 6 credits of blanket-numbered courses, courses that contain a zero as the middle digit (ENVE #0#), may be applied toward the minimum-45-credit Master’s degree.

2.3 Transfer of Credits from MEng to MS or PhD Program

If a student enrolled in the Environmental Engineering MEng program later decides to pursue an MS or PhD degree, then credits obtained in the MEng degree can be transferred to the MS degree or PhD degree program, subject to approval by the student’s MS or PhD Committee.

2.4 Graduate Level Course Requirement

At least 50% of the total coursework for the MEng degree must be “graduate level only” courses. True “graduate level only” courses are at the 500 level and are not cross-listed at the 400 level. All 600 level courses are graduate level only.

3. Advisor & Committee

3.1 Advisor Selection

The Environmental Graduate Committee Chair will serve as the advisor to all MEng degree candidates.

3.2 Committee Selection & Duties

The Committee will consist of at least three members of the graduate faculty: the Environmental Graduate Committee Chair, one additional faculty member in the Major field, and one faculty member in the Minor field. The Committee will perform the following duties: 1) Review and approve the student’s program of study, including the student’s Minor field of coursework study; 2) participate in the Final Examination (see section 1.7).
School of Chemical, Biological and Environmental Engineering
Oregon State University

MEng Degree Curriculum in Environmental Engineering
(45 credits, rev. 9-30-11)

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<td>17</td>
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Total 13-17 14-17 8-15

Notes:
- Graduate ENVE Core, 20 credits: ENVE 507(3x1), CHE 525(4), ENVE 532(4), ENVE 536(1), ENVE 535(4), ENVE 541(4) [Seminar (ENVE 507) is required for all terms]
- Take 1 of ENVE 525, ENVE 556 and ENVE 531. (Depending upon progress, these courses could be distributed into Year 2).
- Graduate Minor: 15+ credits, typically 4-5 courses. (Depending upon progress, these courses could be distributed into Year 2).
- Total Graduate Credits: 45+
- Coursework Credits: 45 minimum (20 Graduate ENVE Core and 15 Graduate Minor, 10 general engineering).
1. Program Philosophy

1.1 MS Thesis Academic Requirement

A M.S. Thesis is required for the M.S. degree in Environmental Engineering. The M.S. Thesis must have one or more of the following elements: contribution to theory; development of new method for scientific investigation; generation of new data which clearly contribute to science and engineering.

1.2 Minimum Academic Requirements for the MS Degree

The M.S. degree program requires a minimum of 45 graduate credit hours, 36 credits of which are reserved for course work and 9 credits for the M.S. Thesis. However, the M.S. Thesis effort will reflect the requirements of the M.S. Thesis stated above, typically up to a year of research effort has been expended to complete the M.S. Thesis. Two-thirds of the work (30 credits including 9 credits for the Thesis) must be in the major field and one-third (15 credits) in the minor field. No more than 6 credits of blanket-numbered courses, courses other than thesis or project that contain a zero as the middle digit (ENVE #0#), may be applied toward the minimum-45-credit Master's degree. Credit hours used in one master's program may not be used in an additional master's program.

All M.S. degree students must earn a cumulative 3.00 GPA for courses listed in their graduate program of study. Any course in their graduate program of study with a grade of C- or lower must be repeated. They must also maintain a cumulative 3.00 GPA for all courses taken at OSU as a graduate student.

1.3 Residence Requirements

After admission to the graduate program, 30 OSU graduate credits as a degree-seeking graduate student are required in residence. Unless on approved Leave of Absence, all graduate students in graduate programs must register continuously for a minimum of 3 graduate credits, excluding summer session, until their degree is granted.

1.4 Registration Requirements

Full-time status as a graduate student is defined by the Oregon University System (OUS) as enrollment in 9 credits per term. M.S. students on GTA (Graduate Teaching Assistant) and GRA (Graduate Research Assistant) appointments are required to register for a minimum of 12 credits each term of the appointment. Graduate Assistants whose appointments range between 0.15 and 0.29 FTE (Full Time Equivalent) may register for a maximum of 15 credits per term. Those whose appointments range from 0.30 and 0.49 FTE may register for no more than 12 credits per term.
1.5 **Graduate Study Program**

Each M.S. degree student is required to find an Advising Professor before the end of their second term of coursework. The student must file a program of study with the Graduate School **before completing 18 hours of graduate credit.** A student who does not file a program of study within the specified deadline will not be allowed to register for the next term.

1.6 **Time Limit**

All work toward a M.S. degree must be completed within 7 years.

1.7 **Final Examination**

Successful completion of a final oral examination is required for all M.S. degrees. The examination committee is nominated by the student's advisor, subject to the approval of the CBEE School Head and the Graduate School.

**M.S. Thesis.** An examination copy of the M.S. Thesis must be presented to the Graduate School **two weeks prior to the final oral examination.** Additional examination copies of the thesis are distributed by the student at this time to other members of the examining committee, including the Graduate Council Representative.

The committee will consist of at least four members of the graduate faculty: two in the Major field, including the student's advisor/major professor; one in the Minor field; and a Graduate Council Representative. **It is the student's responsibility** to obtain his or her own Graduate Council Representative from a list provided by the Graduate School.

**Oral Examination.** The final oral examination must be scheduled through the Graduate School and also must be announced in the School of CBEE not less than one week prior to the date of the examination. The final examination should be scheduled for two hours. No more than half of the examination period should be devoted to the presentation and defense of the thesis; the remaining time can be spent on questions that assess the student's knowledge of the major and minor fields. One dissenting vote is permitted for the M.S. degree and no more than one re-examination is permitted.

2. **Course Requirements**

2.1 **Major Courses (30 credits)**

The Environmental Engineering Program offers the following core courses which must be taken for graduate credit for the major in Environmental Engineering.

- CHE 525 (4) Chemical Engineering Analysis
- ENVE 532 (4) Aquatic Chemistry: Natural and Engineered Systems
- ENVE 535 (4) Physical and Chemical Processes for Hazardous Waste Treatment
ENVE 536 (1)  Aqueous Environmental Chemistry Laboratory
ENVE 541 (4)  Microbial Processes in Environmental Systems
ENVE 507 (3)  Seminar (F, W, S)

For all new graduate students, the enrollment in Seminar (ENVE 507) is required for the first academic year (F, W, S). Attendance in the ENVE 507 Seminar is required for all graduate students. Additional elective courses in the Major area and thesis credits will constitute the remainder of the required Major coursework.

A M.S. candidate without a B.S. degree in Environmental Engineering (or equivalent Engineering degree) must take the following courses in addition to the ENVE core:

Pre-requisite courses (completion required before taking ENVE core courses)
Math through Differential Equations
One year of General Chemistry
One year of Physics
CBEE 211 (3)  Material Balances and Stoichiometry
ENVE 322 (4)  Fundamentals of Environmental Engineering

Co-requisite courses
ENVE 421 (4)  Water and Wastewater Characterization
ENVE 422 (4)  Environmental Engineering Design
CE 547 (4)  Water Resources Engineering I: Principles of Fluid Mechanics

2.2 Minor Courses (15 credits)

A graduate minor is an academic area that clearly supports the major. Neither the Graduate School nor the School of CBEE require a student to pursue an academic minor outside of their major area of study. If a minor is desired, the minor can be one of several choices:

(1) the same academic area as the major with a different area of concentration,
(2) an academic area available only as a minor (from another program at OSU),
(3) a different major,
(4) an approved major at another institution in the OUS,
(5) an integrated minor.

Students pursuing a minor will need a Minor Professor to oversee the completion of their academic minor. For option (1) above, the Minor Professor is an ENVE faculty member. For options (2-5), the Minor Professor would be chosen from graduate faculty in the academic area of interest. Option (4), an integrated minor, consists of a series of cognate courses from two or more academic areas outside the major area of concentration (limit of one ENVE course in an integrated minor). The Minor Professor for an integrated minor must be from outside the ENVE program and represent (at least one of) the academic area(s) of interest.

A list of courses offered by the Environmental Engineering Program that are often part of a minor in same academic area as the major, but with a different area of concentration, are:

ENVE 525 (3)  Air Pollution Control
ENVE 531 (4)  Fate and Transport of Chemicals in Environmental Systems
ENVE 542 (4)  Microbial Process Design for Municipal and Hazardous Wastes
ENVE 554 (4)  Groundwater Remediation
ENVE 556 (3) Sustainable Water Resources Development
ENVE 599 Selected Topics
ENVE 505 Reading and Conference

Reading and Conference, ENVE 505, is used only occasionally and may be taken as a minor ENVE course but is handled on a case-by-case basis with a faculty member willing to act as instructor for the course. No more than 6 credits of blanket-numbered courses, other than thesis, may be applied toward the minimum-45-credit Master’s degree.

2.3 Graduate Level Course Requirement

At least 50\% of the total coursework for the MS degree must be “graduate level only” courses. True “graduate level only” courses are at the 500 level and are not cross-listed at the 400 level. All 600 level courses are graduate level only. The 9 credits of M.S. Thesis (ENVE 503) count towards the 50\% “graduate level only” requirement.

3. Advisor & Committee

3.1 Advisor Selection

All new graduate students arriving fall term must have a Thesis Advisor (Major Professor) by the end of the following winter term. M.S. Thesis Advisor/Major Professor selection is a three-step process. The Environmental Graduate Committee Chair coordinates each step of the advisor selection process described below.

In the first step, the students learn about the current research opportunities within the School. During fall term, new graduate students must attend ENVE seminar (ENVE 507). At this seminar faculty will present their present research interests and opportunities for new graduate students in their research group.

In the second step of the advisor selection process, following their introduction to faculty in the ENVE seminar, the new graduate students are strongly encouraged to make appointments with individual faculty members to further discuss the research projects they are most interested in. This process must be completed by the second week of the following winter term. The new graduate students then fill out the “New Graduate Student Thesis Advisor Preferences” form where they list and rank their top three “faculty member & project” choices. This form must be submitted to the Environmental Graduate Committee Chair by the end of the second week of winter term.

In the third step of the advisor selection process, the faculty will meet to discuss the new graduate student preferences as detailed in the completed “New Graduate Student Advisor Preferences” forms. The faculty member then contacts the student(s) they are interested in and makes an offer to each student to join the research group. This process is to be completed by the end of the seventh week of winter term. If the student accepts a faculty member’s offer, then both faculty member and the student complete and sign the “Major Professor Selection for New Graduate Students” letter. This form is submitted to the Environmental Graduate Committee Chair by the last week of winter term.
The student cannot accept more than one offer. Furthermore, it is not allowed for any student to change his/her choice of a final Major Professor after signing the “Major Professor Selection for New graduate Students” letter, unless the student is placed under extraordinary circumstances which they have discussed with the Environmental Graduate Committee Chair. In situations where no faculty member accepts a new student, the Environmental Graduate Committee Chair or a designated faculty member will work with the School Head to place the student. If a student needs to change his/her advisor because of funding reasons, the student must contact the Environmental Graduate Committee Chair, and the Environmental Graduate Committee Chair or a designated faculty member will work with the School Head to place the student. If a suitable placement cannot be found, the student will be advised to seek a Masters of Engineering degree, MEng, which does not have a thesis component.

The Environmental Graduate Committee Chair is the faculty academic advisor for all Environmental graduate students who have not yet selected a Major Professor/Thesis Advisor. After the student has secured a Major Professor, the major Professor assumes all academic advising responsibilities for the student.

The Graduate School requires that new graduate students secure a Major Professor/Thesis Advisor before completing 18 credits towards the graduate program of study.

3.2 Committee Selection & Duties

The Committee will consist of at least four members of the graduate faculty: the student’s Major Professor/Thesis Advisor, one additional faculty member in the Major field, one faculty member in the Minor field, and a Graduate Council Representative. It is the student’s responsibility to obtain his or her own Graduate Council Representative from a list provided by the Graduate School.

The Committee will perform the following duties: 1) Review and approve the student’s Graduate Study Program for the MS degree in Environmental Engineering, including the student’s Minor field of coursework study; 2) participate in the Final Examination (see section 1.7).
### M.S. Degree Curriculum in Environmental Engineering
(45 credits, rev. 9-30-11)

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<td>Aq. Chem. Lab 1 credit</td>
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<td>9</td>
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<td>3-4 credits</td>
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<td>Grad Minor #1</td>
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<td>12</td>
<td>ENVE 507 Seminar</td>
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<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

**Notes:**
- Graduate ENVE Core, 20 credits: ENVE 507(3x1), CHE 525(4), ENVE 532(4), ENVE 536(1), ENVE 535(4), ENVE 541(4)
- Seminar (ENVE 507) is required for all three terms in the first year (if possible)
- M.S. Thesis, 9+ credits: only 9 thesis credits are counted toward degree requirements; however, thesis credits can exceed 9 units total to meet graduate assistantship requirements (e.g. 12 credits per term)
- Graduate Minor: 15+ credits, typically 4-5 courses. Depending upon the demands of your research assistantship, these course can be distributed into Year 2

**Total Graduate Credits:** 45+

**Coursework Credits:** 36 minimum (21 Graduate Major and 15 Graduate Minor)

**M.S. Thesis Credits:** 9
DOCTORAL DEGREE PROGRAM
Doctor of Philosophy in Environmental Engineering

1. General Requirements

The Doctor of Philosophy degree is granted primarily for creative scholarly achievements. There is no rigid credit requirement; however, the equivalent of at least three years of full-time graduate work beyond the bachelor’s degree is required.

A Ph.D. degree student in the School of Chemical, Biological, and Environmental Engineering must include a minimum of 108 credits on his/her doctoral program. A minimum of one full-time academic year (at least 36 credits) should be devoted to the preparation of thesis. A minimum of one full-time academic year of regular non-blanket course work (at least 36 credits) must be included on the doctoral program. No more than 15 credits of blanket-numbered courses, other than thesis, may be included in the minimum 108-credit program. Coursework completed as part of a Master’s degree (M.S. or M.Eng.) can be transferred for credit towards the doctoral degree with the consent of the student’s doctoral committee.

A Ph.D. candidate without a M.S. degree in Environmental Engineering must take the following six ENVE core courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credit(s)</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 525</td>
<td>(4)</td>
<td>Chemical Engineering Analysis</td>
</tr>
<tr>
<td>ENVE 532</td>
<td>(4)</td>
<td>Aquatic Chemistry: Natural and Engineered Systems</td>
</tr>
<tr>
<td>ENVE 535</td>
<td>(4)</td>
<td>Physical and Chemical Processes for Hazardous Waste Treatment</td>
</tr>
<tr>
<td>ENVE 536</td>
<td>(1)</td>
<td>Aqueous Environmental Chemistry Laboratory</td>
</tr>
<tr>
<td>ENVE 541</td>
<td>(4)</td>
<td>Microbial Processes in Environmental Systems</td>
</tr>
<tr>
<td>ENVE 507</td>
<td>(3)</td>
<td>Seminar (1 credit each term, F,W,Sp)</td>
</tr>
</tbody>
</table>

A Ph.D. candidate without a B.S. degree in Environmental Engineering (or equivalent Engineering degree) must take the following courses in addition to the ENVE core:

- Pre-requisite courses (completion required before taking ENVE core courses)
  - Math through Differential Equations
  - One year of General Chemistry
  - One year of Physics
  - CBEE 211 (3) Material Balances and Stoichiometry
  - ENVE 322 (4) Fundamentals of Environmental Engineering

- Co-requisite courses
  - ENVE 421 (4) Water and Wastewater Characterization
  - ENVE 422 (4) Environmental Engineering Design
  - CE 547 (4) Water Resources Engineering I: Principles of Fluid Mechanics

There are five steps to be completed towards a Ph.D. degree:

(1) Approval of graduate study program
(2) Oral qualifying examination
(3) Preliminary examination
(4) Final oral examination
(5) Thesis submission
2. **Graduate Program of Study**

2.1 **Selecting a Doctoral Committee**

The doctoral committee will consist of a *minimum* of five members of the graduate faculty, including the Major Professor and one additional Environmental Engineering faculty member, one faculty from each declared minor field, and a Graduate Council Representative. It is the student's responsibility to obtain his or her own Graduate Council Representative from a list provided by the Graduate School. The doctoral committee will review and approve the student's program of study for the PhD degree and participate in all formal committee meetings and student examinations required for the PhD degree, including the preliminary and final exams.

2.2 **Filing a Program of Study with the Graduate School**

A graduate student who holds a master's degree must file a program of study form with the Graduate School by the end of their first academic year of enrollment as a doctoral student. A graduate student who *does not* hold a master's degree in Environmental Engineering must file a program of study form with the Graduate School by the end of the fifth quarter of enrollment as a doctoral student. If the program of study form is not filed within the specified deadline, the student will not be allowed to register for the next term.

2.3 **Approval of the Program of Study**

The student's doctoral program of study is formulated and approved subject to departmental policies at a *formal meeting* of his/her doctoral committee. Unlike other formal committee meetings, the program meeting does not need to be scheduled in advance with the Graduate School, but all committee members, including the Graduate Council Representative, must be present. The student must be registered for a minimum of 3 credits for the term in which the program meeting is held.

It is recommended that graduate students have their program of study approved as soon as sufficient information on the proposed research topic is obtained to define the scope of the thesis. When the program of study is approved by the doctoral committee, the department head, and the dean of the Graduate School, it becomes the obligation of the student to complete the requirements as formulated. Changes in the program may be made by submitting a Petition for Change Form available from the Graduate School.

3. **Residence Requirement**

After admission to the doctoral program, students must spend at least three terms of full-time graduate academic work (at least 9 credits/term) on site at the Corvallis campus and a minimum of 36 graduate credits (from Oregon State University) must be completed as a Ph.D. student. Unless on approved Leave of Absence, all graduate students in graduate programs must register continuously for a minimum of 3 graduate credits, excluding summer session, until their degree is granted.
4. Advisor Selection

Because the Graduate School requires that new graduate students secure a Major Professor/Thesis Advisor before completing 18 credits toward their graduate program of study, graduate students admitted fall term must select a Thesis Advisor (Major Professor) by the end of the following winter term. Many incoming PhD students arrive at OSU having already secured a Ph.D. Major Professor/Thesis Advisor through previous agreement. For those students who have not secured a Ph.D. Major Professor/Thesis Advisor before arriving to campus, selection is a three-step process. The Environmental Graduate Committee Chair coordinates each step of the advisor selection process described below.

In the first step, students learn about the current research opportunities within the department. During fall term, new graduate students attend Seminar (ENVE 507) where faculty will present their present research interests as well as discuss opportunities for new graduate students in their research group.

As a second step, students are strongly encouraged to make appointments with individual faculty members to further discuss potential research projects. The new graduate students then complete the “New Graduate Student Thesis Advisor Preferences” form. This process must be completed and the form submitted to the Environmental Graduate Committee Chair by the end of the second week of winter term.

In the third step of the advisor selection process, the faculty will meet to discuss the new graduate student preferences as detailed in the completed “New Graduate Student Advisor Preferences” forms. The faculty member then contacts the student(s) they are interested in and makes an offer to each student to join the research group. This process is to be completed by the end of the seventh week of winter term. If the student accepts a faculty member’s offer, then both faculty member and the student complete and sign the “Major Professor Selection for New Graduate Students” letter. This form is submitted to the Environmental Graduate Committee Chair by the last week of winter term.

The Environmental Graduate Committee Chair is the academic advisor for all graduate students who have not yet selected a Major Professor/Thesis Advisor. After the student has secured a Major Professor, the Major Professor assumes all academic advising responsibilities for the students.

In situations where no match is found between a faculty member and a new student, the Environmental Graduate Committee Chair or a designated faculty member will work with the School Head to place the student. If a suitable placement cannot be found, the student may be advised to seek a Masters of Engineering degree, M.Eng., which does not have a research and thesis component.

5. Oral Qualifying Examination

An Oral Qualifying Examination is required of all PhD candidates prior to the Preliminary Exam. The purpose of the exam is to ensure that each PhD candidate has a mastery of basic Environmental Engineering subjects. The Oral Qualifying Exam is a CBEE School requirement and should be taken upon completion of the first year of coursework. A committee consisting of a minimum of 3 Environmental Engineering graduate faculty members, including the Environmental Graduate Committee Chair, will administer the examination.

The exam should be scheduled for two hours and will consist of an oral examination of the candidate’s breadth of understanding of fundamental Environmental Engineering knowledge.
One dissenting vote is permitted, but **no re-examination is permitted**. Failure to pass the qualifying exam will result in termination of the student’s PhD candidacy. In appropriate cases, students may choose to complete a M.Eng. degree upon termination of their PhD candidacy.

6. **Preliminary Examination**

There are two components to preliminary examinations in the School of Chemical, Biological, and Environmental Engineering: (1) the Written Preliminary Examination, and (2) the Oral Preliminary Examination.

The written preliminary exam followed by an oral defense is intended to evaluate a PhD student's ability to utilize scientific literature, to think critically, to write creatively, to articulate ideas, and to demonstrate understanding of his/her specific field of study. The Preliminary Examination will consist of both written and oral parts. The oral part of this examination will also evaluate the student's breadth of knowledge in areas of broader focus, yet related to the area of research. Generally, the oral part of the exam will begin with an approximately 45 minute presentation by the student, in which he/she presents her research, and thus, the report contents. This will be followed by a question and answer session in which the committee can address both the research itself and also more general knowledge. Preliminary exams should be scheduled for **at least two hours**.

6.1 **Written Preliminary Examination**

The Written Preliminary Exam must be completed prior to the Oral Preliminary Exam. Candidates must write a proposal on their thesis topic and distribute it to their doctoral committee members at least **one week prior** to the date of the Oral Preliminary Exam.

**Guidelines for the Written Research Proposal**

This examination will also test the student's ability to develop, investigate, and defend their original research idea. The originality, scholarly quality, and the technical feasibility of the research proposal will be evaluated.

The format of the written research proposal required for the Preliminary Exam is as follows.

1. The report is intended to contain a summary of the student’s research, to demonstrate knowledge in the area of research, progress so far, expected results, and a timeline for completing the research and thus to graduation.

2. This ‘report’ style document should contain an introduction, literature review, outline of major hypotheses, discussion of methods that will be used to test the hypotheses, preliminary findings up to the point of the exam, a summary, and a timeline indicating roughly when key elements of the research will be completed. Such a report would likely serve as a basis for the first several chapters of the PhD candidate’s dissertation.

3. The written research proposal is limited to **fifteen single-spaced pages** (including references, timeline, etc.)

4. The written research proposal must be written by the PhD candidate with limited input from the thesis advisor.
6.2 Oral Preliminary Examination

The Oral Preliminary Examination is conducted by the student’s doctoral committee and should cover the student’s knowledge in his/her major and minor subjects. The examination consists of an oral defense of the proposal submitted in the Written Preliminary Examination on the candidate’s proposed research topic. However, no more than one-half of the time should be devoted to specific aspects of the thesis project. The first part of the examination (i.e., the presentation and defense of the student’s thesis proposal) is generally presented as a seminar to the student’s doctoral committee. This portion should last no longer than 30 to 45 minutes. The committee will then ask questions relating to the thesis proposal, the candidate’s course work, or the student’s research. All members of the doctoral committee, including the GCR, are expected and encouraged to participate in examining the student. No committee member should be allowed to monopolize the examination, and the student must be given an adequate and fair opportunity to respond to the questions.

The examination will be scheduled for at least two hours, and the examination date must be scheduled with the Graduate School at least one week in advance.

If more than one negative vote is recorded by the examining committee, the candidate will have failed the oral examination. Only one re-examination is permitted.

At least one complete academic term must elapse between the time of the Oral Preliminary Examination and the Final Oral Examination. If more than five years elapse between these two examinations, the candidate must take another Oral Preliminary Examination.

7. Thesis

All PhD candidates must submit a thesis embodying the results of research and presenting evidence of originality and ability in independent investigation. The thesis must constitute a valid contribution to knowledge in the field of study, and must be based on the candidate’s own investigation, including one or more of the following elements:

- Contribution to theory
- Development of new method for scientific investigation
- Generation of new scientific data which clearly contribute to the development of sciences
- Development and/or novel implementation of a numerical model

The thesis must reflect a mastery of the literature of the subject and be written in scientific format.

7.1 Graduate School Thesis Regulations

Regulations concerning the doctoral thesis are the same as those for the master’s degree with the following exceptions:

(1) An examination copy of the thesis must be presented to the Graduate School (and the doctoral committee members) at least two weeks prior to the final oral examination:
(2) Within six weeks of the final oral examination, two final copies of the thesis must be submitted to the OSU library and one extra copy of the abstract and title page must be deposited unbound with the Graduate School.

8. Final Oral Examination

After completion of or while concurrently registered for all work required by the program, the student must pass a final oral examination. The final oral examination must be scheduled with the Graduate School not less than two weeks prior to the date of the examination. The final oral examination must be announced in the School of Chemical, Biological, and Environmental Engineering no less than two weeks prior to the examination date.

The thesis defense portion of the final oral examination is open to all interested persons. After the open portion of the exam, the examining committee excludes all other persons and continues with the examination of the candidate’s knowledge of the field of study and the evaluation of the candidate’s performance. The oral final examination should be scheduled for at least two hours.

8.1 Re-examination

The candidate is expected to defend their thesis during the final oral exam and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate has failed the examination. Only one re-examination is permitted.

8.2 Timing

The final oral examination must be taken within five years after the oral preliminary examination. If more than five years elapse, the candidate is required to take another oral preliminary examination. The student must be registered for at least 3 credits during the term the final examination is to take place.
December 9, 2011

To:  Whom it may concern

From:  Kenneth Williamson, Professor

Subject:  Liaisons for Environmental Engineering Graduate Degrees Cat. 1 Proposal

Liaison comments were requested from the following person and organization both internal and external to OSU.

Internal to OSU

College and University Administration

Caru Green, Assistant Dean of Academic Programs, CAS  
cary.green@oregonstate.edu
Jim Lundy, Executive Associate Dean, COE  
Jim.Lundy@oregonstate.edu
Sherman Bloomer, Dean, COS  
Sherman.bloomer@orst.edu
Hal Salwasser, Dean, COF  
Hal.salwasser@orst.edu
Tammy Bray, Dean, Public Health and Human Sciences,  
trammy.bray@oregonstate.edu
Walt Loveland, Chair, Budgets and Fiscal Planning Committee  
lovelanw@onid.orst.edu
Carolyn Aldwin, Chair, Graduate Council  
carolyn.aldwin@oregonstate.edu
Mike Bailey, Chair, Curriculum Council  
mike.bailey@oregonstate.edu
Brenda McComb, Dean, Graduate School  
Brenda.mccomb@oregonstate.edu

Chairs and Heads

Biological and Ecological Engineering
John Bolte, Head  
john.bolte@oregonstate.edu

Crop and Soil Science
Russ Karow, Head  
russell.s.karow@orst.edu

Microbiology
Theo Dreher, Chair  
theo.dreher@oregonstate.edu

Forest Engineering, Resources and Management
Thomas Maness, Head  
thomas.maness@oregonstate.edu

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Paul Doescher, Interim Head  paul.doescher@oregonstate.edu

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David Trejo, Acting Head  david.trejo@oregonstate.edu

Mechanical Engineering
Robert Stone, Acting Head rob.stone@oregonstate.edu

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Nuclear Engineering
Kathy Higley, Head  Kathryn.higley@oregonstate.edu

Water Resources Program
Mary Satelman, Director  santelmm@geo.oregonstate.edu

Water Resources Engineering
Steve Lancaster, Associate Director  Stephen.Lancaster@geo.oregonstate.edu

Water Resources Science
Roy Hagerty, Associate Director  hagert@geo.oregonstate.edu

Water Resources Policy
Courtland Smith, Associate Director  csmith@oregonstate.edu

Environmental Science Program
Andy Blaustein, Director  blaustea@science.oregonstate.edu

Bioresource Research Program
Kate Field, Director  kate.field@oregonstate.edu

Agricultural and Resource Economics
Susan Capalbo, Head  capalbos@onid.orst.edu

Environmental and Molecular Toxicology
Craig Marcus, Head  craig.marcus@oregonstate.edu

Public Health
Marie Harvey, Chair  Marie.harvey@oregonstate.edu

External

Civil and Environmental Engineering, PSU
Copies of the letters of response are attached. No concerns were raised with the proposal.
Summary of Liaison Comments from OSU:

Terri Fiez, EECS:
Looks fine to me.

Robert Stone, MIME
MIME has no concerns with your proposal and supports it.

Mary Santelmann, Water Resources Program
I have no objection to making this change and providing students with an opportunity to represent their area of concentration in graduate school on their transcripts.

Summary of Liaison Comments from External to OSU:

Brad Tebo, OHSU
We have no objections to your proposed degrees.

Alan Dickman, Environmental Studies Program, UO
I see no overlap with the Environmental Studies graduate program at the University of Oregon and your proposed new graduate degrees in Environmental Engineering. I wish you the best as your proceed with plans to develop this program.

Scott Wells, Department of Civil and Environmental Engineering, PSU
Thanks for the notice—your Envir Engr students really need this to go through.
December 9, 2011

To: Whom it may concern

From: Kenneth Williamson, Professor

Subject: Liaisons for Environmental Engineering Graduate Degrees Cat. 1 Proposal

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Hal Salwasser, Dean, COF  Hal.salwasser@orst.edu
Tammy Bray, Dean, Public Health and Human Sciences,  trammy.bray@oregonstate.edu
Walt Loveland, Chair, Budgets and Fiscal Planning Committee  lovelanw@onid.orst.edu
Carolyn Aldwin, Chair, Graduate Council  carolyn.aldwin@oregonstate.edu
Mike Bailey, Chair, Curriculum Council  mike.bailey@oregonstate.edu
Brenda McComb, Dean, Graduate School  Brenda.mccomb@oregonstate.edu

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Kate Field, Director kate.field@oregonstate.edu

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Environmental and Molecular Toxicology
Craig Marcus, Head craig.marcus@oregonstate.edu

Public Health
Marie Harvey, Chair Marie.harvey@oregonstate.edu

External

Civil and Environmental Engineering, PSU
Copies of the letters of response are attached. No concerns were raised with the proposal.
Williamson, Kenneth J.

From: Fiez, Terri
Sent: Wednesday, November 23, 2011 11:46 AM
To: Williamson, Kenneth J.
Subject: RE: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

Ken,
Looks fine to me.
Terri

From: Williamson, Kenneth J.
Sent: Wednesday, November 23, 2011 10:16 AM
To: Fiez, Terri; Roy Haggerty
Subject: FW: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

From: Williamson, Kenneth J.
Sent: Wednesday, November 23, 2011 9:57 AM
To: Bolte, John; 'russell.s.karow@orst.edu'; 'Dreher, Theo'; Maness, Thomas; Maness, Thomas; Trejo, David; Stone, Rob; 'Terri.fiez@oregonstate.edu'; Higley, Kathryn A; 'santelmm@geo.oregonstate.edu'; 'Stephen.Lancaster@geo.oregonstate.edu'; Smith, Court; Blaustein, Andy; 'Field, Kate'; Capalbo, Susan M - ONID; Marcus, Craig; Harvey, Marie; 'hagartr@geo.oregonstate.edu'
Subject: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

DATE: October 17, 2011

TO:

Biological and Ecological Engineering
John Bolte, Head

Crop and Soil Science
Russ Karow, Head

Microbiology
Theo Dreher, Chair

Forest Engineering, Resources and Management
Thomas Maness, Head

Forest Ecosystems and Society
Tom Adams, Head

Civil and Construction Engineering
David Trejo, Acting Head

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Agricultural and Resource Economics
Susan Capalbo, Head

Environmental and Molecular Toxicology
Craig Marcus, Head

Public Health
Marie Harvey, Chair

FROM: Kenneth Williamson

SUBJECT: Curriculum Liaison

The attached Category I proposal describes our proposed new graduate degrees in Environmental Engineering. In accordance with the liaison criteria in the Curricular Procedures Handbook, this memo serves as notification to your Department, School or Program of our intent to make this curricular change. The entire packet of materials for the proposal can be viewed at https://secure.oregonstate.edu/ap/cps/proposals/view/82814.

Please review the attached materials or send to the appropriate person in your unit and send comments, concerns, or support to me by December 1, 2011. Your timely response is appreciated.

Please note that a lack of response will be interpreted as support.
Thank you for your time and input.

KJW

Kenneth J. Williamson
Professor
School of Chemical, Biological and Environmental Engineering
541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu
Williamson, Kenneth J.

From: Robert B. Stone, Ph.D. [Rob.Stone@oregonstate.edu]
Sent: Tuesday, November 29, 2011 9:12 AM
To: Williamson, Kenneth J.
Subject: Re: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

Ken,

MIME has no concerns with your proposal and supports it. Thanks,

Rob

Robert B. Stone, Ph.D.
Professor and Interim Head
School of Mechanical, Industrial and Manufacturing Engineering
Oregon State University
208 Rogers Hall
Corvallis, Oregon 97331
Phone: 541-737-3638
rob.stone@oregonstate.edu
designengineeringlab.org

On Nov 26, 2011, at 4:02 PM, Williamson, Kenneth J. wrote:

Please note that the reply date was wrong....it should be December 8th....

KJW

Kenneth J. Williamson
Professor
School of Chemical, Biological and Environmental Engineering
541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu

From: Williamson, Kenneth J.
Sent: Wednesday, November 23, 2011 9:57 AM
To: Bolte, John; russell.s.karow@orst.edu'; 'Dreher, Theo'; Maness, Thomas; Maness, Thomas; Trejo, David; Stone, Rob;
'Terri.feiz@oregonstate.edu'; Higley, Kathryn A; 'santelmm@geo.oregonstate.edu';
'Stephen.Lancaster@geo.oregonstate.edu'; Smith, Court; Blaustein, Andy; 'Field, Kate'; Capalbo, Susan M - ONID;
Marcus, Craig; Harvey, Marle; 'hagetr@geo.oregonstate.edu'
Subject: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

DATE: October 17, 2011
TO:

Biological and Ecological Engineering
John Bolte, Head

Crop and Soil Science
Russ Karow, Head

Microbiology
Theo Dreher, Chair

Forest Engineering, Resources and Management
Thomas Maness, Head

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Thank you for your time and input.

KJW

Kenneth J. Williamson
Professor
School of Chemical, Biological and Environmental Engineering
541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu
Williamson, Kenneth J.

From: Brad Tebo [tebo@ebs.ogi.edu]
Sent: Monday, December 05, 2011 8:42 PM
To: Williamson, Kenneth J.
Subject: Re: Cat. 1 for New Graduate Degrees in Environmental Engineering

Hi,

We have no objection to your proposed degrees.

Regards,
Brad

Bradley M. Tebo, Ph.D.
Professor and Division Head
Division of Environmental & Biomolecular Systems
Co-Director, Institute of Environmental Health
Oregon Health & Science University
20000 NW Walker Road
Beaverton, OR 97006

phone: 503-748-1992
fax: 503-748-1464
email: tebo@ebs.ogi.edu
web: http://www.ebs.ogi.edu/tebo
http://www.ebs.ogi.edu/faculty/tebo

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Kenneth J. Williamson
Professor
School of Chemical, Biological and Environmental Engineering
541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu

From: Williamson, Kenneth J.
Sent: Wednesday, November 23, 2011 9:53 AM
To: scott@eas.pdx.edu; georgel@pdx.edu; midennis@uoregon.edu; adickman@uoregon.edu; tebo@ebs.ogi.edu
Cc: Williamson, Kenneth J.

Subject: Cat. 1 for New Graduate Degrees in Environmental Engineering

DATE: October 17, 2011

TO:

Civil and Environmental Engineering, PSU
Scott Well, Chair

Environmental Science, PSU
Linda George, Chair

Environmental Studies, UO
Matthew Dennis, Graduate Studies Alan Dickman, Director

Division of Environmental and Biomolecular Systems, OHSU
Bradley Tebo, Division Head

FROM: Kenneth Williamson

SUBJECT: Curriculum Liaison

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Please note that a lack of response will be interpreted as support.

Thank you for your time and input.

KJW

Kenneth J. Williamson
Professor
School of Chemical, Biological and Environmental Engineering
541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu
Dear Kenneth:

I see no overlap with the Environmental Studies graduate program at the University of Oregon and your proposed new graduate degree in Environmental Engineering.

I wish you the best as your proceed with plans to develop this program.

Sincerely,

Alan

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Alan Dickman
Director, Environmental Studies Program
Sr Instructor, Res. Assoc. Professor, Biology and Environmental Studies

office: 302 Pacific Hall
voice: 541 346-2549
facsimile: 541 346-2543

mail: Department of Biology, 1210 University of Oregon, Eugene, Oregon 97403-1210
internet: http://biology.uoregon.edu/people/Dickman/dickman.php
Environmental Studies: http://envs.uoregon.edu/

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Sorry...KJW

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Sent: Saturday, November 26, 2011 6:32 PM
To: Williamson, Kenneth J.
Cc: Matthew Dennis
Subject: Re: Cat. 1 for New Graduate Degrees in Environmental Engineering

HI Kenneth

It looks like you forgot to include the attachment. I didn't get it, in any case. I don't recall getting anything back in October.
PS to Matt -- comments always welcome, but I'll coordinate a response on this

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**Alan Dickman**  
Director, Environmental Studies Program  
Sr Instructor, Res. Assoc. Professor, Biology and Environmental Studies

office: 302 Pacific Hall  
voice: 541 346-2549  
fax/mule: 541 346-2543

mail: Department of Biology, 1210 University of Oregon, Eugene, Oregon 97403-1210  
internet: http://biology.uoregon.edu/people/Dickman/dickman.php  
Environmental Studies: http://envs.uoregon.edu/

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kenneth.williamson@oregonstate.edu

<Proposal.pdf>
Williamson, Kenneth J.

From: Mary Santelmann [santelmm@onid.orst.edu]
Sent: Thursday, December 08, 2011 5:06 PM
To: Williamson, Kenneth J.
Subject: RE: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

Ken,

I have no objection to making this change and providing students with an opportunity to represent their area of concentration in graduate school on their transcripts.
Best,
Mary

From: Williamson, Kenneth J. [mailto:Kenneth.Williamson@oregonstate.edu]
Sent: Wednesday, November 23, 2011 9:57 AM
To: Bolte, John; russell.s.karow@orst.edu; Dreher, Theo; Maness, Thomas; Maness, Thomas; Trejo, David; Stone, Rob; Terrl.feiz@oregonstate.edu; Higley, Kathryn A; santelmm@geo.oregonstate.edu; Stephen.Lancaster@geo.oregonstate.edu; Smith, Court; Blaustein, Andy; Field, Kate; Capalbo, Susan M - ONID; Marcus, Craig; Harvey, Marie; hagertr@geo.oregonstate.edu
Subject: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

DATE: October 17, 2011

TO:

Biological and Ecological Engineering
John Bolte, Head

Crop and Soil Science
Russ Karow, Head

Microbiology
Theo Dreher, Chair

Forest Engineering, Resources and Management
Thomas Maness, Head

Forest Ecosystems and Society
Tom Adams, Head

Civil and Construction Engineering
David Trejo, Acting Head

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Robert Stone, Acting Head

Electrical Engineering and Computer Science
Terri Feiz, Head

Nuclear Engineering
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From: Scott Wells [scott@cecs.pdx.edu]
Sent: Wednesday, November 23, 2011 11:37 AM
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Subject: RE: Cat. 1 for New Graduate Degrees in Environmental Engineering

Ken: Thanks for the notice — your Envir Engr students really need this to go through. I am on my way to Brazil for a few days — let’s catch up one of these days. I thought you weren’t doing this anymore? Cheers, Scott

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Professor
School of Chemical, Biological and Environmental Engineering
541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu
Summary of Liaison Comments from OSU:

Terri Fiez, EECS:
Looks fine to me.

Robert Stone, MIME
MIME has no concerns with your proposal and supports it.

Mary Santelmann, Water Resources Program
I have no objection to making this change and providing students with an opportunity to represent their area of concentration in graduate school on their transcripts.

Summary of Liaison Comments from External to OSU:

Brad Tebo, OHSU
We have no objections to your proposed degrees.

Alan Dickman, Environmental Studies Program, UO
I see no overlap with the Environmental Studies graduate program at the University of Oregon and your proposed new graduate degrees in Environmental Engineering. I wish you the best as your proceed with plans to develop this program.

Scott Wells, Department of Civil and Environmental Engineering, PSU
Thanks for the notice—your Envir Engr students really need this to go through.
December 9, 2011

To: Whom it may concern

From: Kenneth Williamson, Professor

Subject: Liaisons for Environmental Engineering Graduate Degrees Cat. 1 Proposal

Liaison comments were requested from the following person and organization both internal and external to OSU.

Internal to OSU

College and University Administration

Caru Green, Assistant Dean of Academic Programs, CAS
cary.green@oregonstate.edu
Jim Lundy, Executive Associate Dean, COE       Jim.Lundy@oregonstate.edu
Sherman Bloomer, Dean, COS      Sherman.bloomer@orst.edu
Hal Salwasser, Dean, COF       Hal.salwasser@orst.edu
Tammy Bray, Dean, Public Health and Human Sciences,
tammy.bray@oregonstate.edu
Walt Loveland, Chair, Budgets and Fiscal Planning Committee
lovelanw@onid.orst.edu
Carolyn Aldwin, Chair, Graduate Councilcarolyn.aldwin@oregonstate.edu
Mike Bailey, Chair, Curriculum Council      mike.bailey@oregonstate.edu
Brenda McComb, Dean, Graduate School        Brenda.mccomb@oregonstate.edu

Chairs and Heads

Biological and Ecological Engineering
John Bolte, Head      john.bolte@oregonstate.edu

Crop and Soil Science
Russ Karow, Head      russell.s.karow@orst.edu

Microbiology
Theo Dreher, Chair      theo.dreher@oregonstate.edu

Forest Engineering, Resources and Management
Thomas Maness, Head    thomas.maness@oregonstate.edu

Forest Ecosystems and Society
Paul Doescher, Interim Head  paul.doescher@oregonstate.edu

Civil and Construction Engineering
David Trejo, Acting Head  david.trejo@oregonstate.edu

Mechanical Engineering
Robert Stone, Acting Head  rob.stone@oregonstate.edu

Electrical Engineering and Computer Science
Terri Fiez, Head  Terri.fiez@oregonstate.edu

Nuclear Engineering
Kathy Higley, Head  Kathryn.higley@oregonstate.edu

Water Resources Program
Mary Satelman, Director  santelmm@geo.oregonstate.edu

Water Resources Engineering
Steve Lancaster, Associate Director  Stephen.Lancaster@geo.oregonstate.edu

Water Resources Science
Roy Hagerty, Associate Director  hagertr@geo.oregonstate.edu

Water Resources Policy
Courtland Smith, Associate Director  csmith@oregonstate.edu

Environmental Science Program
Andy Blaustein, Director  blaustea@science.oregonstate.edu

Bioresource Research Program
Kate Field, Director  kate.field@oregonstate.edu

Agricultural and Resource Economics
Susan Capalbo, Head  capalbos@onid.orst.edu

Environmental and Molecular Toxicology
Craig Marcus, Head  craig.marcus@oregonstate.edu

Public Health
Marie Harvey, Chair  Marie.harvey@oregonstate.edu

External

Civil and Environmental Engineering, PSU
Scott Wells, Chair  
scott@eas.pdx.edu

Environmental Science, PSU  
Linda George, Chair  
georgel@pdx.edu

Environmental Studies, UO  
Matthew Dennis, Graduate Studies  
mjdennis@uoregon.edu
Alan Dickman, Director  
adickman@uoregon.edu

Division of Environmental and Biomolecular Systems, OHSU  
Bradley Tebo, Division Head  
tebo@ebs.ogi.edu

Copies of the letters of response are attached. No concerns were raised with the proposal.
Ken,
Looks fine to me.
Terri

From: Williamson, Kenneth J.
Sent: Wednesday, November 23, 2011 10:16 AM
To: Fiez, Terri; Roy Haggerty
Subject: FW: Cat. 1 Proposal for Graduate Degrees in Environmental Engineering

DATE: October 17, 2011
TO:

Biological and Ecological Engineering
John Bolte, Head

Crop and Soil Science
Russ Karow, Head

Microbiology
Theo Dreher, Chair

Forest Engineering, Resources and Management
Thomas Maness, Head

Forest Ecosystems and Society
Tom Adams, Head

Civil and Construction Engineering
David Trejo, Acting Head

Mechanical Engineering
Robert Stone, Acting Head
FROM: Kenneth Williamson

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Professor
School of Chemical, Biological and Environmental Engineering
541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu
Ken,

MIME has no concerns with your proposal and supports it. Thanks,

Rob

Robert B. Stone, Ph.D.
Professor and Interim Head
School of Mechanical, Industrial and Manufacturing Engineering
Oregon State University
208 Rogers Hall
Corvallis, Oregon 97331
Phone: 541-737-3638
robert.stone@oregonstate.edu
designengineeringlab.org

On Nov 26, 2011, at 4:02 PM, Williamson, Kenneth J. wrote:

Please note that the reply date was wrong....it should be December 8th....

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Professor
School of Chemical, Biological and Environmental Engineering
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kenneth.williamson@oregonstate.edu

From: Williamson, Kenneth J.
Sent: Wednesday, November 23, 2011 9:57 AM
To: Bolte, John; russell.s.karow@orst.edu'; 'Dreher, Theo'; Maness, Thomas; Maness, Thomas; Trejo, David; Stone, Rob;
'Terri.feiz@oregonstate.edu'; Higley, Kathryn A; 'santelmm@geo.oregonstate.edu';
'Stephen.Lancaster@geo.oregonstate.edu'; Smith, Court; Blaustein, Andy; 'Field, Kate'; Capalbo, Susan M - ONID;
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David Trejo, Acting Head

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Terri Feiz, Head

Nuclear Engineering
Kathy Higley, Head

Water Resources Program
Mary Satelman, Director

Water Resources Engineering
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Water Resources Science
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Professor
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541-737-6836
cell 541-752-3319
kenneth.williamson@oregonstate.edu
Hi,

We have no objection to your proposed degrees.

Regards,
Brad

Bradley M. Tebo, Ph.D.
Professor and Division Head
Division of Environmental & Biomolecular Systems
Co-Director, Institute of Environmental Health
Oregon Health & Science University
20000 NW Walker Road
Beaverton, OR 97006

phone: 503-748-1992
fax: 503-748-1464
email: tebo@ebs.ogi.edu
web: http://www.ebs.ogi.edu/tebo
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kenwil@oregonstate.edu
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kenneth.williamson@oregonstate.edu
From: Alan Dickman [adickman@uoregon.edu]
Sent: Tuesday, November 29, 2011 9:48 AM
To: Williamson, Kenneth J.
Cc: Matthew Dennis; Andrew Marcus; Dana Johnston
Subject: Re: Cat. 1 for New Graduate Degrees in Environmental Engineering

Dear Kenneth:

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Sr Instructor, Res. Assoc. Professor, Biology and Environmental Studies

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voice: 541 346-2549
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mail: Department of Biology, 1210 University of Oregon, Eugene, Oregon 97403-1210
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Table 1. New Resources
Budget Outline Form
Estimated Costs and Sources of Funds for Proposed Program

Total new resources required to handle the increased workload, if any. If no new resources are required, the budgetary impact should be reported as zero.

Prepare one page each of the first four years

<table>
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<th>Indicate the year:</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>Fourth</th>
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<td>Academic Year: 2012-2013</td>
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Column A | Column B | Column C | Column D | Column E | Column F
---|---|---|---|---|---
From Current Budgetary Unit | Institutional Reallocation from Other Budgetary Unit | From Special State Appropriation Request | From Federal Funds and Other Grants | From Fees, Sales and Other Income | LINE ITEM TOTAL

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<th>Personnel</th>
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<td>Support Staff (Include FTE)</td>
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<tr>
<td>Library/Electronic</td>
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<tr>
<td>Supplies and Services</td>
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<tr>
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<tbody>
<tr>
<td>Construction</td>
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<tr>
<td>Major Renovation</td>
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<td><strong>Physical Facilities Subtotal</strong></td>
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</table>

**GRAND TOTAL** $2,000

**$2,000**
### Table 1. New Resources

#### Budget Outline Form

Estimated Costs and Sources of Funds for Proposed Program

Total new resources required to handle the increased workload, if any. If no new resources are required, the budgetary impact should be reported as zero.

- **Institution:** Oregon State University
- **Program:** Chemical, Biological and Environmental Engineering
- **Academic Year:** 2013-2014

#### Indicate the year:

- First x
- Second
- Third
- Fourth

**Prepare one page each of the first four years**

**Column A**

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Column B</th>
<th>Column C</th>
<th>Column D</th>
<th>Column E</th>
<th>Column F</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Institutional Reallocation from Other Budgetary Unit</td>
<td>From Special State Appropriation Request</td>
<td>From Federal Funds and Other Grants</td>
<td>From Fees, Sales and Other Income</td>
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<td>Faculty (Include FTE)</td>
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<tr>
<td>Graduate Assistants (Include FTE)</td>
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<tr>
<td>Support Staff (Include FTE)</td>
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<td>0</td>
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</tr>
<tr>
<td>Fellowships/Scholarships</td>
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<tr>
<td>Nonrecurring</td>
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**Other Resources**

| Library/Printed | 0 | 0 | 0 | 0 | 0 |
| Library/Electronic | 0 | 0 | 0 | 0 | 0 |
| Supplies and Services | $2,050 | 0 | 0 | 0 | 0 |
| Equipment | 0 | 0 | 0 | 0 | 0 |
| Other Expenses | 0 | 0 | 0 | 0 | 0 |
| **Other Resources Subtotal** | $2,050 | 0 | 0 | 0 | 0 |

**Physical Facilities**

| Construction | 0 | 0 | 0 | 0 | 0 |
| Major Renovation | 0 | 0 | 0 | 0 | 0 |
| Other Expenses | 0 | 0 | 0 | 0 | 0 |
| **Physical Facilities Subtotal** | 0 | 0 | 0 | 0 | 0 |

**GRAND TOTAL**

$2,050
### Table 1. New Resources

Institution: Oregon State University  
Program: Chemical, Biological and Environmental Engineering  
Academic Year: 2014-2015  

Prepare one page each of the first four years

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<th>Column C From Special State Appropriation Request</th>
<th>Column D From Federal Funds and Other Grants</th>
<th>Column E From Fees, Sales and Other Income</th>
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## Budget Outline Form

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

**Institution:** Oregon State University  
**Program:** Chemical, Biological and Environmental Engineering  
**Academic Year:** 2015-2016

Indicate the year:  
- _____ First  
- _____ Second  
- _____ Third  
- **x** Fourth  

*Prepare one page each of the first four years*

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</table>
1. Review - College Approver - Engineering

**Sent Back** by Sarah Williams Coord-Curriculum / Acad Prgms/Assess/Accred, February 10, 2012 11:18am

**Comments**

Sarah Williams (College Approver - Engineering) February 10, 2012 11:18am
Returning to Originator to upload additional document. SW

2. Originator Response

**Kenneth Williamson** Emeritus Appointment / Sch of Civil/Constr Engr, February 10, 2012 11:37am

**Comments**

Kenneth Williamson February 10, 2012 11:37am
Done...KJW

3. Review - College Approver - Engineering

**Approved** by Mario Magana Associate Professor / Sch Elect Engr/Comp Sci, February 15, 2012 12:33pm

**Comments**

Mario Magana (College Approver - Engineering) February 15, 2012 12:33pm
Liasons don't have objections and all other criteria are satisfied.

4. Review - Curriculum Coordinator

**Approved** by Gary Beach Coord-Curriculum / Acad Prgms/Assess/Accred, February 27, 2012 10:48am

**Comments**

Gary Beach (Curriculum Coordinator) February 27, 2012 10:48am
This proposal was submitted, by email notification, to the Budgets and Fiscal Planning Committee for their review on February 10, 2012. -- Gary

5. Review - Budgets and Fiscal Planning Committee

**Approved** by Walter Loveland, March 15, 2012 2:21pm