Request for Approval of a New Named Option in the Existing Master of Engineering Degree, Civil and Environmental Engineering Major, in Environmental Engineering

College of Engineering
Department of Civil and Environmental Engineering
Department of Engineering Professional Development
March 28, 2014

Provost Paul DeLuca, Jr.
Dean Martin Cadwallader

Re: Master of Engineering – Environmental Engineering Option

Dear Provost DeLuca and Dean Cadwallader:

The College of Engineering (CoE) requests approval of the option in Environmental Engineering for the Master of Engineering in Civil and Environmental Engineering. This proposal was approved on February 19, 2014 by the CoE Master of Engineering Oversight Committee and then by the CoE Academic Planning Council on March 12, 2104.

This online Environmental Engineering option, intended for distance students, provides the University of Wisconsin with an opportunity to demonstrate its leadership in engineering education while helping address the needs of the environmental engineering profession. This proposal was developed collaboratively by the Departments of Civil and Environmental Engineering (CEE) and Engineering Professional Development (EPD). Our analysis of potential students and employers has determined there is strong interest for an online master of engineering degree focusing on greater technical depth in the subjects outlined by the Environmental Engineering Body of Knowledge, along with professional engineering competencies.

Utilizing our past experience with online programs for professional engineers as a guide, we are scaling-up our capabilities for program administration and student support. For this effort, start-up funding has been provided through a Division of Continuing Studies Educational Innovation grant, the College of Engineering, and Engineering Professional Development. Our business plan anticipates this program will be financially self-supporting in the third year of operation.

Recognized nationally as the leader in providing students with high quality online education, the University will gain an important advantage in establishing this proposed program now. Other higher education institutions are aggressively expanding online offerings and prospective students will soon have many more choices available to them. Consequently, we are seeking to enable those potential students to begin their studies with us in the fall of 2015. Based on preliminary inquiries we expect to have about 20 students in the first set of classes planned for fall 2015.
Thank you for your consideration.

Sincerely,

Steven M. Cramer

Steven M. Cramer, PhD, PE
Associate Dean of Academic Affairs and Professor
College of Engineering
University of Wisconsin-Madison
1415 Engineering Drive
Madison, WI 53706

cramer@engr.wisc.edu
608-262-3484

Cc: Dean I. Robertson
Assoc. Provost J. Milner
Asst. Dean K. Haslam
Prof. C. Benson
Prof. P. O’Leary
REQUEST FOR APPROVAL OF A NEW OPTION IN THE EXISTING MASTER OF ENGINEERING DEGREE, CIVIL AND ENVIRONMENTAL ENGINEERING MAJOR; NEW NAMED OPTION: ENVIRONMENTAL ENGINEERING (FULLY ONLINE)

1.0 Summary and Requested Action

Approval from the Graduate Faculty Executive Committee (GFEC) is requested by the College of Engineering for a new program revenue online degree program. The proposed new program is a new named option to be offered under the existing Master of Engineering (M.Eng.), Civil and Environmental Engineering major degree. The proposed named option is Environmental Engineering, in accordance with the flexibility of the College to create and retire options within the M.Eng. degree as part of the UW System Regents’ 1998 authorization of the M.Eng. degree. The proposal has been reviewed and approved by the Department of Civil and Environmental Engineering, the Department of Engineering Professional Development, the Master of Engineering Oversight Committee, and the College of Engineering Academic Planning Council.

A project team with members from the Department of Engineering Professional Development (EPD) and the Department of Civil & Environmental Engineering (CEE) studied the feasibility of the proposed online Master of Engineering, Civil and Environmental Engineering, Option: Environmental Engineering (MEng CEE: EnvE) in 2013 and designed the program now recommended for approval. The Program Development Team included the following from CEE and EPD:

<table>
<thead>
<tr>
<th>Department</th>
<th>Name</th>
<th>Notes</th>
<th>Contact email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil and Environmental Engineering</td>
<td>Craig H. Benson</td>
<td>Wisconsin Distinguished Professor and Chair</td>
<td><a href="mailto:chbenson@wisc.edu">chbenson@wisc.edu</a></td>
</tr>
<tr>
<td></td>
<td>Michael D. Doran</td>
<td>Professor of Practice</td>
<td><a href="mailto:mddoran@wisc.edu">mddoran@wisc.edu</a></td>
</tr>
<tr>
<td></td>
<td>Trevor Ghylin</td>
<td>Dissertator</td>
<td><a href="mailto:ghylin@wisc.edu">ghylin@wisc.edu</a></td>
</tr>
<tr>
<td></td>
<td>Gregory W. Harrington</td>
<td>Professor</td>
<td><a href="mailto:gwharrin@facstaff.wisc.edu">gwharrin@facstaff.wisc.edu</a></td>
</tr>
<tr>
<td></td>
<td>Steven P.</td>
<td>Associate</td>
<td><a href="mailto:loheide@wisc.edu">loheide@wisc.edu</a></td>
</tr>
</tbody>
</table>
Key conclusions from the combined CEE/EPD team are:

- A strong potential market exists for online professional master’s degrees in Environmental Engineering, as found in a marketing study completed in September 2013.
- The proposed curriculum provides learning outcomes desired by practicing environmental engineers, and it meets the guidelines of the Environmental Engineering Body of Knowledge adopted by the American Academy of Environmental Engineers and Scientists (AAEES).
- The proposed revenue program is expected to be financially viable long term. Including $70,000 in development funding awarded to CEE in December 2013 by the Division of Continuing Studies for an Educational Innovation grant, the program can generate positive cash flow in its third year of operation.
- EPD and CEE Chairs and key faculty have been actively engaged in program planning and are committed to this effort.

We respectfully request the committee review and approve development of the proposed program to enable UW-Madison to establish a visible leadership position in environmental engineering and allow the first class of students to begin studies in the 2015 fall semester.

2.0 BACKGROUND AND RATIONALE

2.1 Background

As the roles and responsibilities of environmental engineers have become increasingly complex, and as environmental challenges have persisted and become multi-media in form, the profession
of environmental engineering will be called upon to address environmental challenges that will require inter-disciplinary and multi-contextual engineering approaches. Environmental engineers of the future will require a broad understanding of environmental science and engineering, social systems, the legal framework, risk management, economics and finance, as well as a substantial depth of knowledge in specific areas of the environmental engineer’s practice. In addition, environmental engineers will need to demonstrate competencies in technical leadership, communications, and management to work effectively across technical and organizational boundaries, as outlined in the Environmental Engineering Body of Knowledge.\footnote{Environmental Engineering Body of Knowledge, the Environmental Engineering Body of Knowledge Taskforce, The American Academy of Environmental Engineers, Annapolis MD, May 2009.}

Environmental Engineering, as a discipline, is also growing at a rate twice that of any other engineering group. Over the next 10 years, more than 10,000 new positions will open. Though 60% of jobs will likely be filled with master’s prepared individuals, there exists a viable market for Environmental Engineering Master’s Degrees, including engineers with undergraduate degrees in disciplines other than environmental engineering that have assumed roles with environmental engineering organizations.

Unfortunately the competitive marketplace is filled with more than 400 degree programs, and more than 20 online degree programs. Success of the proposed program will hinge on our ability to differentiate ourselves, and build upon the quality reputation UW-Madison’s top ranked online graduate engineering degrees have established.

2.2 Rationale

To determine the feasibility of a Masters level Environmental Engineering named option, CEE and EPD performed a market assessment in 2013. The assessment was based on an email survey sent to approximately 12,000 prospective students taken from appropriate UW Engineering Alumni, Engineering Professional Development marketing lists, and randomly selected US-based mechanical and civil/environmental engineers from CE News magazine, with a response rate of 1% (214 respondents). The purpose of the assessment was to determine the level of interest, level of employer support, funding sources, and program design requirements for those in the target market.

Key takeaways from the survey indicated:

1. An environmental engineering degree is a valued credential among the target population.
2. Any degree program for the target population should be fully online.
3. Water related coursework is most valued in the target audience.
4. Nontechnical topics, especially project management, are highly valued in the target audience.
5. Employer funding for graduate education is diminishing.
6. Career advancement is not the primary motivation for potential participants.

The survey also indicated that practicing early and mid-career engineers are not likely to interrupt their careers to study on campus in pursuit of this knowledge or a graduate degree,
however program affiliation with a respected brick and mortar institution held great value.

In addition to the email survey, telephone interviews with employers and industry professionals were also conducted. In general, the employer respondents felt that a master’s degree was a desirable, if not required, credential for professional practice in environmental engineering, with one-third reporting that their organizations only hired engineers with a master’s degree. Employers were also supportive of employees undertaking graduate work.

Given the program’s potential, and its ability to complement, rather than compete with, existing on-campus degrees and certificates, the program was recommended for development.

3.0 NAMED OPTION DESIGN

3.1 Master of Engineering Degree

The existing Master of Engineering Degree was approved in 1998 as a way to serve both students and employers by providing specific options focused on practice-oriented Master’s degrees that would allow students to keep up with the latest science and technology and maintain their competitiveness. The Master of Engineering is a terminal degree, following a Bachelor’s degree in an ABET, Inc., accredited engineering program².

The topics emphasized by these options are expected to shift fairly rapidly as the relevant industrial practices evolve. The Department of Engineering Professional Development currently offers four named options in the Master of Engineering degree/major, as shown in Table 1.

<table>
<thead>
<tr>
<th>Degree</th>
<th>Major</th>
<th>Named Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Engineering</td>
<td>Engineering</td>
<td>Professional Practice (Engineering Management) (MEPP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine Systems (MEES)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical Japanese</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sustainable Systems Engineering (SSE)</td>
</tr>
</tbody>
</table>

These named options are offered through online instruction, and were ranked #3 in January 2014 by U.S. News and World Report in its survey of online graduate engineering programs, placing the University in the top ten for the third year in a row. UW–Madison’s programs were judged on factors such as a high level of student collaboration and participation, the availability of instructors to answer student questions, small class size, and the inclusion of an instructional designer dedicated to developing courses to meet online learner needs.

² Graduates of allied sciences may be accepted if certain pre-requisites are satisfied.
3.2 New Named Option for Master of Engineering in Civil and Environmental Engineering: Environmental Engineering

Using the experience gained through the existing Master of Engineering options, EPD and CEE are requesting its first named option be added in Environmental Engineering within the Master of Engineering degree, Civil and Environmental Engineering Major.

<table>
<thead>
<tr>
<th>Degree</th>
<th>Major</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Engineering</td>
<td>Engineering</td>
<td>Professional Practice (Engineering Management) (MEPP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine Systems (MEES)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical Japanese</td>
</tr>
<tr>
<td>Civil &amp; Environmental Engineering</td>
<td></td>
<td>Sustainable Systems Engineering (SSE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental Engineering</td>
</tr>
</tbody>
</table>

4.0 ADMINISTRATIVE STRUCTURE AND GOVERNANCE

4.1 Administrative Structure

The supporting operations for this named option will be managed by EPD. The option will be coordinated by a Program Director under the supervision of EPD’s Director of Distance Degree Programs. Interviews for this position are occurring in March 2014 under PVL #78473. An Academic Director (Michael Doran), under the supervision of the Chair of CEE, will also be assigned. A joint EPD and CEE committee will provide review and direction for this named option. An advisory committee consisting of leaders from industry, government, and other University Departments will be formed prior to degree launch to support annual program review, and long-term strategy. Alumni of the program will be added as available as well. Supporting staff from EPD have also been assigned to assist in technology management, marketing, admissions, instructional design and program assistance. The work breakdown between CEE and EPD is shown in Table 3.

Table 3. Proposed Program Administration of M. Eng. CEE: Environmental Engineering

<table>
<thead>
<tr>
<th>Program Functions – Lead Organization</th>
<th>EPD</th>
<th>CEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Director</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Program Director</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Degree Approval Process</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Financial Administration</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Marketing</td>
<td>P</td>
<td>S</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----</td>
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</tr>
<tr>
<td>Course Content Development</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>Instructional Systems Design for Course Development</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Instruction and Teaching Assistance</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>Admissions Communications</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Acceptance Communications</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Program Requirements for Graduation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Academic Advising</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>Course/Instructor Availability and Scheduling</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Advisory Board</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>P</td>
<td>S</td>
</tr>
<tr>
<td>Course Enrollment and Tuition Communications</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Technical Support</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Student Records</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Graduation</td>
<td>S</td>
<td>P</td>
</tr>
</tbody>
</table>

X = Responsible    P = Primary    S = Secondary

### 4.2 Assessment and Continuous Improvement

CEE and EPD are committed to using an assessment strategy that will ensure high impact to students and their employers, and high quality of services to students, faculty, and alumni. The planning committee will build upon and adapt evaluation methods currently employed by CEE for ABET assessment and in EPD by the MEPP degree program, which have been selected as a model best program assessments.

Elements of the assessment program will include:

- Mid-course surveys for all new course to enable early detection and corrective action to ensure course content and logistics are responsive to students’ needs and interests
- An end-of-semester evaluation of each course by students and the instructor focusing on achievement of AAES Body of Knowledge learning outcomes and additional outcomes established for the program
- A detailed programmatic evaluation by students at graduation
- A impact survey conducted 9-12 months after graduation that includes graduates, and workplace supervisors and/or professional peers.

Feedback from all sources will be reviewed with faculty, staff and the program advisory committee to identify opportunities and actions for continuous quality improvement.

Performance of this program will be reported annually to the College of Engineering Master of Engineering oversight Committee. Regular reviews of the program will also be conducted and reported to the Provost’s Office as part of the regular review process of the Master of Engineering degree.
5.0 ADMISSIONS AND DEGREE REQUIREMENTS

5.1 Admission Requirements

An admissions committee will be assembled for the degree including faculty from each department. Each application will be individually reviewed by its members. The committee will include the Director of Engineering Distance Degree Programs, the program director for this degree, the academic program director from CEE, the Director of Student Services for the Department of Engineering Professional Development, and other faculty from the CEE program development team or as may be assigned by the CEE Chair.

The admission requirements for the MEng CEE:EnvE option were created to meet or exceed the requirements for a Master of Engineering degree (Table 4) and the Graduate School’s 30 credit degree requirement. Exceptions to any of these requirements could be made on an individual basis at the discretion of the admissions committee. Each student recommended for admission by the committee must then receive admission approval from the Graduate School.

Table 4. Requirements for Master of Engineering degree, Civil and Environmental Engineering Major, in a New Named Option in Environmental Engineering

<table>
<thead>
<tr>
<th>Master of Engineering Degree Requirement</th>
<th>Environmental Engineering Named Option Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>UW Graduate School Admissions Requirements</td>
<td>B.S. in Engineering from an ABET accredited program, &gt; 3.0 GPA</td>
</tr>
<tr>
<td>Minimum of 24 credits (all programs must meet 30 credits by Fall 2014)</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum of 9 credits at the 600 level or above</td>
<td>15 credits of courses in the proposed core curriculum are at the 600 level</td>
</tr>
<tr>
<td>Minimum of 12 credits from the College of Engineering</td>
<td>15 credits of courses in the proposed core curriculum and many electives are from CoE</td>
</tr>
<tr>
<td>If students do not have relevant work experience, 6 credits of engineering professional practice must be provided</td>
<td>For any students without experience, projects throughout the curriculum and in the capstone project will provide professional practice</td>
</tr>
</tbody>
</table>

Up to 6 transfer credits of prior coursework at the graduate level or credits of prior coursework from an undergraduate degree completed at the University of Wisconsin-Madison will be accepted to provide students flexibility. Transfer of credits must be approved by the program’s Academic Director, and if approved, may be used to fulfill core or elective credit requirements within the MEng EnvE curriculum.

5.2 Graduation Requirements

In order to fulfill the Master of Engineering degree requirements, each student must maintain at
least a ‘B’ (3.0 on a scale of 0-4) average throughout the program. Any individual class in which the student receives a ‘D’ or lower must be repeated. The curriculum provided in Section 6.0 will outline the specifics of how these requirements will be met.

Finally, should any students be accepted into the MEng CEE:EnvE option lacking appropriate work experience in their chosen field, they must complete at least six credits of engineering professional practice. Three credits of this requirement will be met by a capstone project (CEE 628). The additional three credits can be met through the projects required in core courses, with additional opportunities for professional practice provided by optional independent research, or through other elective courses with a project requirement. Students will be assigned an academic advisor to help them tailor course selection to meet degree and specialty requirements and to help students ensure they meet their learning goals.

6.0 CURRICULUM

The proposed program has been designed to meet the guidelines of the Environmental Engineering Body of Knowledge (EnvE BOK)\(^3\), which describes the minimum competencies required for an individual to enter environmental engineering professional practice. The EnvE BOK lists and describes eighteen learning outcomes and summary guidance for master’s level programs in relation to the outcomes. These outcomes, shown in Table 4, were used as requirements during curriculum planning.

**Table 4. Reference List of EnvE BOK Learning Outcomes Achieved by MS/30 (from Appendix A of the AAEE Environmental Engineering Body of Knowledge)**

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Knowledge and Skills from MS/30</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Basic Environmental, Math and Science (BEMS)</td>
<td>• Apply knowledge domains of the BEMS as necessary to analyze and solve (open-ended(^4)) predictable problems appropriate to environmental engineering.</td>
</tr>
</tbody>
</table>
| 2. Design and Conduct Experiments       | • Conduct an experiment using appropriate state-of-the-art tools to develop information or to test a hypothesis related to a predictable problem appropriate to environmental engineering.  
  • Analyze and interpret the results of experimentation and explain the resulting information using appropriate communication tools.  
  • Design an experiment to develop specific information or to test a specific hypothesis related to a predictable problem appropriate to environmental engineering. |
| 3. Modern Engineering Tools             | • Recognize the limitations of the various tools with respect to appropriateness, accuracy, consistency and sensitivity.  
  • Apply modern engineering tools to multi-disciplinary environmental engineering problem solving. |


\(^4\) Not explicitly stated but this is the intent of the EnvE BOK.
<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Knowledge and Skills from MS/30</th>
</tr>
</thead>
</table>
| 4. In-Depth Competence                   | • Analyze a predictable environmental process or system in a traditional or emerging area.  
• Design a predictable environmental process or system in a traditional or emerging area.                                                                                                                                  |
| 5. Risk, Reliability and Uncertainty     | • Analyze the potential exposure and risk to the environment and exposed populations for multiple chemical and biological exposure routes and hazards.  
• Analyze the modes for failure of a system engineered to protect human or environmental health and quantify the resulting consequences of such a failure.  
• Design an engineered system applying the principles of probability and statistics to uncertainties in data or knowledge.                                                                                                      |
| 6. Problem Formulation and Conceptual Analysis | • Apply advanced level technical knowledge and problem analysis/solving skills to complex multidisciplinary projects.  
• Analyze problems appropriate to environmental engineering having unpredictable or incomplete parameters to determine their root causes.  
• Analyze feasibility and appropriateness of predictable solutions as alternatives to conventional solutions to problems.                                                                                                           |
| 7. Creative Design                       | • Apply creativity and knowledge domains of BEMS to design a real-world system or process to meet desired needs.  
• Analyze real world situations to determine design needs and requirements.  
• Assess compliance with customary standards of practice, client’s needs and relevant constraints appropriate to environmental engineering to develop solutions to real world problems.                                             |
| 8. Sustainability                        | • Analyze the sustainability of an engineered system using traditional or emerging tools (e.g., industrial ecology, life-cycle assessment).  
• Ascertain where new knowledge or forms of analysis are necessary for sustainable design.  
• Design traditional or emerging engineered systems using principles of sustainability.                                                                                                                                 |
| 9. Multimedia Breadth and Interactions   | • Apply fundamental principles governing intermedia transport and fate of substances to a complex situation (e.g., where mass transfer is rate limited).  
• Analyze a system that incorporates intermedia transport and fate of pollutants.                                                                                                                                                                       |
| 10. Societal Impact and Environmental Policy | • Integrate potential societal impacts into solving environmental problems in a specialized area.                                                                                                                                                                      |
| 11. Globalization and Other Contemporary Issues | • Describe how globalization of technology and other contemporary issues has influenced design and/or project delivery within a technical area of environmental engineering.  
• Participate in discussion and debate focused on globalization and contemporary issues and their relationship with and potential impact on public health and the environment.  
• Synthesize information on contemporary issues to provide perspective on relevance to environmental engineering problems.                                                                                                                  |
<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Knowledge and Skills from MS/30</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Multi-Disciplinary Teamwork to Solve Environmental Problems</td>
<td>This outcome is not included for MS/30 emphasis in the EnvE BOK, but is considered very important and relevant for the program. A graduate-level design experience including interdisciplinary factors and considerations should be considered.</td>
</tr>
<tr>
<td>13. Professional and Ethical Responsibilities</td>
<td>• Analyze an environmental engineering situation involving conflicting ethical and professional interests to determine an appropriate course of action.</td>
</tr>
</tbody>
</table>
| 14. Effective Communication | • Make effective presentations to technical audiences.  
• Interpret the content of communications from technical and non-technical stakeholders in a concept or project.  
• Plan, compose and integrate the verbal, written, virtual, and graphical communications of a concept or project for technical and non-technical audiences.  
• Communicate the concept of uncertainty and risk to technical and non-technical audiences.  
• Develop conclusions that logically follow from data results and discussion. |
| 15. Lifelong Learning | • Identify additional knowledge, skills and attitudes appropriate for continued practice at the professional level.  
• Integrate self-directed learning of issues that apply to environmental engineering. |
| 16. Project Management | • Apply project management skills and approaches to a project. |
| 17. Business and Public Administration | This outcome is not included for MS/30 emphasis in the EnvE BOK, but is considered very important and relevant for the program. The program should include opportunities to business, financial and economic factors within the knowledge and skills obtained. |
| 18. Leadership | This outcome is not included for MS/30 emphasis in the EnvE BOK, but is considered very important and relevant for the program. Opportunities for teamwork and leadership of teams should be included within the program. |

6.1 Courses

Table 5 provides a summary of the proposed curriculum in relation to extant courses either offered within CEE or by EPD, and categorizes them relative to the perceived effort to make them distance learning-ready within the proposed MEng CEE: EnvE named option. The proposed 30-credit curriculum consists of 22 core credits and 8 electives. Elective credits will allow students to customize their learning program with greater technical depth in a subject of interest. One elective course would also be faculty-mentored independent study where the student could submit a proposed plan of course study for approval. Courses marked as “New” will be developed starting in Summer 2014 and submitted for approval in Fall 2014. These

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5 Wording in bold italic was not included in EnvE BOK, but the outcomes described are seen as very important to success of graduates and of the proposed program.
courses will initially only be available in the online MEng CEE: EnvE program, though CEE intends to offer on-campus sections of these courses in the future.

Table 5. The proposed MEng CEE:EnvE Curriculum

<table>
<thead>
<tr>
<th>No.</th>
<th>Crs.</th>
<th>Description/Discussion (see notes below)</th>
<th>Distance Learning - Ready</th>
<th>Exist. Distance Course Mod.</th>
<th>Course Offered on Campus</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>EPD 641: Essential Skills for Engineering Productivity</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>CEE New: Hydraulics and Applied Fluid Mechanics&lt;sup&gt;7&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>CEE New: Chemical Principles of Environmental Engineering</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>EPD 642: Thermal Systems Engineering&lt;sup&gt;8&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>CEE New: Biological Principles of Environmental Engineering</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>CEE 821: Biological Treatment Processes</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>CEE 822: Physical-Chemical Unit Operations</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Environmental Engineering Seminar&lt;sup&gt;9&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>EPD 669: Master’s Level Capstone Design Project&lt;sup&gt;10&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

<sup>6</sup> Modification of some course materials is necessary to best serve environmental engineering students.
<sup>7</sup> This is not an entirely new course, but has substantial overlap with CEE 410 (Hydraulic Engineering). It is possible that CEE 410 could be modified to meet the needs of the program.
<sup>8</sup> EPD 642, a distance delivered course, would be modified to meet the needs of this program.
<sup>9</sup> Existing on-campus course would be webcast for distance students.
<sup>10</sup> This course could be offered concurrently with the ME SSE capstone (EPD 669) which will be distance-ready at time of proposed course rollout.
<sup>11</sup> Listed as new course, but major elements of this course exist in CEE 414 ‘Hydrologic Design.’
Courses marked as distance learning-ready have an existing course suitable for environmental engineering students that is being delivered or is planned for delivery on a distance-delivery model. Courses marked as distance ready but requiring modification require some modifications of existing distance-learning course materials to best suit this student group. Courses marked as having on-campus course version require development of distance-learning course materials based on existing course structure and learning goals. Courses marked as new are not currently taught and require detailed course development including modules and learning materials for each module, all prepared in a distance-learning format. Faculty will receive one month of salary for new course development.

6.2 Learning Objectives

Table 6 provides a summary of learning outcomes for each course in the proposed MEng: CEE EnvE curriculum.

**Table 6. Learning Objectives (Student Achievements and Capabilities) for Courses in the MEng CEE:EnvE Curriculum**

<table>
<thead>
<tr>
<th>Core Courses</th>
<th>Student Achievements and Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Skills for Engineering</td>
<td>• Set up and understand your online learning environment</td>
</tr>
<tr>
<td>Productivity</td>
<td>• Prepare a learning plan and calendar, and your personal mission statement</td>
</tr>
<tr>
<td></td>
<td>• Develop effective and efficient document management, information retrieval, and file organization</td>
</tr>
<tr>
<td></td>
<td>skills</td>
</tr>
<tr>
<td></td>
<td>• Learn to use online tools to successfully complete group projects</td>
</tr>
<tr>
<td></td>
<td>• Sharpen your ability to create and present information in an efficient, clear, and useful way</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>• Weekly podcast seminar on environmental engineering and science topics presented by faculty, invited</td>
</tr>
<tr>
<td>and Science Seminar</td>
<td>speakers and in residence graduate students; forum discussions with fellow students and faculty</td>
</tr>
<tr>
<td></td>
<td>concerning seminar information and conclusions – goal is to provide students with broad</td>
</tr>
<tr>
<td></td>
<td>exposure to contemporary environmental engineering and science challenges and research.</td>
</tr>
<tr>
<td>Course</td>
<td>Student Achievements and Capabilities</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hydraulics and Applied Physical Mechanics</td>
<td>• Understand and apply concepts of conservation of mass and conservation of energy related to fluid flow.</td>
</tr>
<tr>
<td>for Environmental Engineers</td>
<td>• Understand types of piping, valves, channels, gates, pumps, blowers, compressors and other equipment and appurtenances commonly used for conveying fluids and gases in environmental engineering.</td>
</tr>
<tr>
<td></td>
<td>• Understand principal factors affecting major and minor energy losses in conduit flow, and analyze and apply those factors using accepted relationships to estimate total energy losses in a given flow system for water, other liquids, sludge/biosolids mixtures or gas under steady flow conditions.</td>
</tr>
<tr>
<td></td>
<td>• Understand problems of unsteady flow and transient flow conditions that may be encountered in environmental engineering, and how related problems may be addressed by design.</td>
</tr>
<tr>
<td></td>
<td>• Understand systems normally employed for flow measurement and select appropriate method and equipment for application in conduits carrying water, liquids, sludge/biosolids mixtures or gases normally encountered in environmental engineering.</td>
</tr>
<tr>
<td></td>
<td>• Understand and apply theory and practice in the analysis and design of hydraulic control structures commonly employed in environmental engineering.</td>
</tr>
<tr>
<td></td>
<td>• Analyze and design full pipe and open channel systems, including pumping systems, for conveying liquids, sludge/biosolids mixtures and gases normally encountered in environmental engineering problems.</td>
</tr>
<tr>
<td></td>
<td>• Using normal capacity factors, and knowledge gained in the course, analyze water and sewer needs for a small community and design associated systems.</td>
</tr>
<tr>
<td></td>
<td>• Apply knowledge gained in the course to perform analyses and design of hydraulic components of plant facilities including sizing of hydraulic control structures, piping, channels, pumps, weirs, etc., for series and parallel flow distributive arrangements, and compute related hydraulic profiles.</td>
</tr>
<tr>
<td>Chemical Principles of Environmental Engineering</td>
<td>• Understand and describe the relationships between principal chemicals of concern in the environment and human health and the health of ecosystems.</td>
</tr>
<tr>
<td></td>
<td>• Understand and describe fundamental factors related to the fate and transport of chemical pollutants in the environment.</td>
</tr>
<tr>
<td></td>
<td>• Understand and describe principal chemical processes in the environment that are affected by human activities.</td>
</tr>
<tr>
<td></td>
<td>• Understand and describe methods for laboratory and in-situ measurement of principal chemicals of concern.</td>
</tr>
<tr>
<td></td>
<td>• Apply knowledge, including knowledge of statistics, to describe significance of environmental datasets.</td>
</tr>
<tr>
<td></td>
<td>• Understand and apply chemical properties, concepts and reactions in processes to reduce or control chemical pollution in air, water and soil.</td>
</tr>
</tbody>
</table>
### Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Achievements and Capabilities</th>
</tr>
</thead>
</table>
| Thermal Systems Engineering                  | • Understand and apply thermodynamic equations, equations of state, and the energy equation.  
• Apply energy equation to perform calculations involving heating and mechanical work.  
• Understand ideal gas law relationships and use of physical constants in computations involving ideal gases.  
• Understand and utilize the first and second law of thermodynamics.  
• Calculate thermodynamic properties of reactants and products.  
• Understand and utilize specific heats of substances in calculations involving energy flow.  
• Understand basic principles of thermal conductivity and heat transfer, and perform computations involving heating and cooling of structures and contents of process vessels and transferring heat using heating systems and heat exchangers. |
| Biological Principles of Environmental Engineering | • Understand and describe fundamental relationships between pathogens and biological agents and human and ecosystem health.  
• Understand and apply models common to environmental engineering practice for microbial growth, substrate utilization, and product formation.  
• Understand and describe relationships between nutrient enrichment and trophic status of water bodies.  
• Understand and apply concepts of watershed management for control and improvement of water body quality. |
| Biological Treatment Unit Operations         | • Understand and apply advanced theory and applications of biological systems for the treatment of wastes.  
• Understand and apply statistical methods for the design of experiments and analysis of data from laboratory and bench scale experiments to assess waste treatability and to provide design parameters.  
• Apply experimentally derived factors and experiential factors in the design of advanced biological treatment unit operations. |
| Physical-Chemical Unit Operations           | • Understand and apply advanced theory and applications of physical-chemical systems for the treatment of water and wastes.  
• Understand and apply statistical methods for the design of experiments and analysis of data from laboratory and bench scale experiments to assess water and waste treatability and to provide design parameters.  
• Apply experimentally derived factors and experiential factors in the design of advanced physical-chemical unit operations. |
### Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Achievements and Capabilities</th>
</tr>
</thead>
</table>
| Master’s Level Capstone Design Project| • Develop teamwork and leadership skills needed to plan and design solutions to open ended problems in environmental engineering.  
• Apply knowledge gained in ME EnvE curriculum and baccalaureate program to provide analysis of options and develop effective solution to an open ended design challenge.  
• Develop written and spoken communication skills necessary to gain client and public input to solutions development and acceptance of a developed solution to an environmental engineering challenge.  
• Gain experience in preparing key deliverables required in environmental engineering practice.                                                                                     |

### Elective Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Achievements and Capabilities</th>
</tr>
</thead>
</table>
| Core Competencies of Sustainability       | • Calculate and analyze carbon and ecological footprints  
• Compare and evaluate different sustainability frameworks  
• Describe and use life-cycle thinking and assessment  
• Explain the effect of consumption on sustainability  
• Identify and assess the significance of relationships between natural resources and energy  
• Recognize sustainability as a global challenge associated with social inequity and requiring engineering/science leadership, multiple perspectives and solutions  
• Explain the importance of the built environment and green building  
• Discuss how sustainable development can fuel innovation  
• Synthesize course lessons as they relate to engineering applications and decision-making  
• Describe in detail the relevant professional competencies and how sustainability could affect those choices.                                                                   |
| Air Pollution, Measurement and Control    | • Understand and describe the influence of human-caused pollution on the atmosphere, globally and locally.  
• Evaluate human health, economic, and aesthetic effects of air pollution.  
• Understand and apply techniques for measurement of atmosphere pollutant concentrations and determination of local and regional air quality.  
• Detailed understanding of air pollution sources and methods for control.  
• Understand the role of local, state and federal government in air pollution control.                                                                                             |
### Elective Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Achievements and Capabilities</th>
</tr>
</thead>
</table>
| Urban Hydrology and Stormwater Management | • Understand and apply models common to environmental and water resource engineering practice to predict hydrologic response of watersheds to storms of varying return frequency.  
• Understand and apply green practices to reduce peak stormwater flow rate and volume in the urban environment.  
• Understand and apply built systems to convey, attenuate, treat and store stormwater in the urban environment.  
• Understand and apply concepts to enhance the wet weather hydraulic and treatment capacity of wastewater treatment facilities. |
| Environmental Systems Modeling     | • Understand systems dynamics approaches to modeling environments using STELLA software  
• Understand how stocks, flows, equilibrium, randomness and seasonality affect systems dynamics  
• Demonstrate information feedback, loops and growth in a systems environment  
• Model pitfalls and cyclical behaviors in group projects                                                                 |
| Technical Project Management      | • Learn practical strategies, tools and methods to successfully plan, schedule, budget and execute projects  
• Identify and manage project critical resources and allocate resources among several projects  
• Understand methods of establishing project budgets and their relative advantages  
• Identify and manage budget uncertainty  
• Understand and assess sources of risk and demonstrate strategies for reducing and managing risk  
• Demonstrate strategies for leading productive project audits  
• Assess and improve an organization's project management capabilities                                                                 |
| Mentored Independent Study         | • Student will gain knowledge and application skills in areas of special interest within the practice of environmental engineering.  
• Student will gain expertise in self-study and research.  
• Develop and enhance written and verbal communication skills.                                                                 |

### 6.3 Student Degree Planning

Using existing online flexible degree programs as a guide, the curriculum was structured into a three-year degree program. This plan assumes students take nine terms (fall, spring and summer) for degree completion. The following student course plan outlines a hypothetical course progression\(^\text{12}\).

**Fall Term 1 (5 credits)**  
Essential Skills for Engineering Productivity, 2 crs  
Biological Principles of Environmental Engineering, 3 crs  
*Total: 5 credits*

---

\(^\text{12}\) Each student would not have an identical progression as a result of optional courses.
Spring Term 2 (3 credits, 8 credits cumulative)
Environmental Chemistry, 3 crs

Summer Term 3 (3 credits, 11 credits cumulative)
Technical Project Management, 3 crs

Fall Term 4 (3 credits, 14 credits cumulative)
Thermal Systems Engineering, 3 crs

Spring Term 5 (3 credits, 17 credits cumulative)
Biological Treatment Unit Operations, 3 crs

Summer Term 6 (3 credits, 20 credits cumulative)
Hydraulics and Applied Fluid Mechanics, 3 crs

Fall Term 7 (3 credits, 23 credits cumulative)
Physical-Chemical Unit Operations, 3 crs

Spring Term 8 (4 credits, 27 credits cumulative)
Capstone Design Project, 3 crs
Environmental Seminar, 1 cr

Summer Term 9 (3 credits, 30 credits cumulative)
Urban Hydrology & Stormwater, 3 crs

6.4 Course Delivery

The MEng CEE EnvE option is to be offered as a distance-learning program, using the software and methods previously developed and tested for the award-winning Master of Engineering programs as a baseline. The primary delivery mechanism is via asynchronous Internet delivery, supplemented with weekly web conferences and discussion forums for each course.

New students will be strongly encouraged to attend an optional 2-day orientation program on campus. This program will be designed to help students get off to a strong start in the program, improving their success and retention. The on-campus program will also build student-student, student-instructor, and student-staff relationships, and will strengthen the bond between students and UW faculty and research. Student retention, time-to-degree and grades will be tracked to determine whether this on-campus program is effective in improving student performance and retention. Students will not be required to come to campus again until graduation celebrations.

The UW College of Engineering Moodle Platform has been selected as the information technology platforms. A degree “portal” will also be developed that will act as the single entrance site for students to access student services, technical support, and courses.

6.5 Faculty Plan

The following instructors have been identified for proposed program courses and are in support
of the program. Many of the instructors were also on the development committee.

**Table 7. Proposed Faculty Plan for MEng CEE EnvE program**

<table>
<thead>
<tr>
<th>Course</th>
<th>Core or Elective</th>
<th>Dept</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Science and Engineering Seminar</td>
<td>Core</td>
<td>CEE</td>
<td>Varies</td>
</tr>
<tr>
<td>Biological Principles of Environmental Engineering</td>
<td>Core</td>
<td>CEE</td>
<td>Noguera</td>
</tr>
<tr>
<td>Chemical Principles of Environmental Engineering</td>
<td>Core</td>
<td>CEE</td>
<td>Doran</td>
</tr>
<tr>
<td>Hydraulics and Applied Fluid Mechanics for Environmental Engineers</td>
<td>Core</td>
<td>CEE</td>
<td>Doran</td>
</tr>
<tr>
<td>Biological Treatment Processes</td>
<td>Core</td>
<td>CEE</td>
<td>Noguera</td>
</tr>
<tr>
<td>Physical-Chemical Treatment Processes</td>
<td>Core</td>
<td>CEE</td>
<td>Harrington</td>
</tr>
<tr>
<td>Urban Hydrology and Stormwater Management</td>
<td>Elective</td>
<td>CEE</td>
<td>Potter</td>
</tr>
<tr>
<td>Air Pollution Effects, Measurement and Control</td>
<td>Elective</td>
<td>CEE</td>
<td>Schauer</td>
</tr>
<tr>
<td>Master’s Capstone Design</td>
<td>Core</td>
<td>CEE</td>
<td>Doran</td>
</tr>
<tr>
<td>Essential Skills for Engineering Professionals</td>
<td>Core</td>
<td>EPD</td>
<td>TBD</td>
</tr>
<tr>
<td>Thermal Systems Engineering</td>
<td>Core</td>
<td>EPD</td>
<td>S. Anderson</td>
</tr>
<tr>
<td>Technical Project Management</td>
<td>Elective</td>
<td>EPD</td>
<td>TBD</td>
</tr>
<tr>
<td>Environmental Systems Modeling</td>
<td>Elective</td>
<td>Nelson</td>
<td>Mutlu Ozdogan</td>
</tr>
<tr>
<td>Core Competencies of Sustainability</td>
<td>Elective</td>
<td>EPD</td>
<td>Pat Eagan</td>
</tr>
<tr>
<td>Independent Study</td>
<td>Elective</td>
<td>EPD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

EPD offers a unique model for new instructors and online course development designed to provide an exceptional level of support. Faculty will receive up to one month of funding from EPD for developing new courses or adapting campus courses to the online delivery method used in the MEng CEE: EnvE curriculum, typically used in the summer. In addition to financial support, faculty will be provided with instructional design and technical support for developing materials. As an additional benefit, participating faculty will have unrestricted use of all online course materials, enabling their use for on-campus instruction.

When participating faculty’s classes are offered, their departments will receive 25% of off-campus tuition revenue for courses, these funds being the source of CEE instructor compensation (overload). Teaching assistants will also be funded by EPD. This revenue sharing follows the established CoE Credit Courses at a Distance revenue sharing model. It assumes that one quarter (25%) of the tuition revenue generated by graduate students enrolled in this program will be returned directly to the department and instructor teaching the course, to be distributed at their
discretion. Another 25% will be used to provide partnering faculty with instructional technology and support, student services, and teaching assistance. A third 25% will be allocated to support the development of future CoE distance learning initiatives. The remaining 25% will be used for marketing, administration, and online delivery infrastructure, as shown below.

![Graph showing revenue sharing model]

**Figure 3.** Revenue Sharing Model between the SSE Program, EPD, Faculty and Student Services.

### 6.5 Student Services

Proactive and highly responsive student services are critical to the success of online degree programs. It is essential that from a prospective student’s first inquiry, through application, admission, and their entire program of academic study, students feel personal attention to their interests and needs. In an online environment, students who feel isolated, frustrated, or unsupported will fail to complete courses or will readily transfer to another institution. Keeping students engaged, progressing, and confident that their learning goals are being met is critical to student success and to the viability of the program itself.

Meeting the student services needs of the MEng CEE:EnvE students will require a well-coordinated effort between EPD and CEE. EPD, as the College’s lead department in outreach to practicing engineers, will have lead responsibility for design and coordination of student services for the proposed program. Student services provided directly by EPD will include:

- communications with prospective students
- assisting applicants with admission
• leading review of applications by a program admission committee of EPD and CEE faculty
• coordination of student issues with the Graduate School, Financial Aid, Registrar, and other campus offices
• coordination with library services from Wendt Commons, computer-related services from Computer-Aided Engineering, and other resources as needed
• ensuring students with special needs have access to needed services (e.g., McBurney Center)
• ensuring that students have adequate and timely documentation to secure tuition reimbursement from employers
• assisting students with course registration
• instructional technology support, including effective and efficient use of online tools used in program courses.

CEE will take the lead in academic advising, including:
• helping students choose the best elective courses to meet their learning goals;
• determining the acceptability of prior credits students desire to transfer and use toward meeting degree requirements
• determining the suitability of alternative courses at UW or other universities to meet program requirements
• helping MEng CEE: EnvE connect with relevant teaching and research resources within CEE (e.g., seminars, research projects, student groups, faculty and students with similar project interests)

7.0 COLLABORATIONS AND PARTNERSHIPS

This program is supported by multiple groups. In addition to EPD and CEE, the College of Engineering and Division of Continuing Studies provided financial support for the feasibility study portion of this development project. The campus’s support for this new named option is further evidenced by the commitment by the Division of Continuing Studies to provide $70,000 in start-up funds in an Educational Innovation Grant, awarded in December 2013.

8.0 ENROLLMENT PROJECTIONS

Based on the results of EPD’s market survey and our experience with existing online Master of Engineering options, we project that MEngr CEE: EnvE enrollment will consist of a mix of recent graduates and mid-career engineers studying at a distance. These will be students who would be unlikely to resign their jobs and move to Madison to pursue a graduate degree.

Enrollment of matriculated students in the program’s first year is assumed to be 15 students. Enrollment in subsequent years is assumed to be 20 new students per year. These Base Case levels are “reasonable estimates” based on experience to date with other CoE distance degree programs and are supported by the marketing study for this proposed program. Enrollment
targets will be set higher (30+) and if achieved, will substantially improve program financial performance.

In addition to matriculated students, the program is assumed to generate the following number of course registrations from special students: Year One, 4; Year Two, 6; Year Three, 8; Year Four, 10. These students pay the same tuition as if they were graduate students. Special students would be pursuing knowledge from individual courses and/or groups of courses grouped into certificate programs.

The program is assuming it will achieve 90% retention and successful degree completion by matriculated students. EPD experience with existing online degree programs has demonstrated that this retention rate is achievable with high-quality courses and proactive student services.

9.0 BUSINESS PLAN

As part of the feasibility study completed by EPD and CEE, a Business Plan was developed to examine the financial viability of the proposed program and explores the required logistics, program management, and program support needed to achieve a high-quality, sustainable program that delivers strategic benefits to CEE, EPD, the College of Engineering, the Division of Continuing Studies, and the UW-Madison campus.

The program will require substantial investment in the early years as course development proceeds and enrollment builds. Not including funding provided by the Educational Innovation Grant, anticipated negative cash flows in early years are: Year Zero, $221k; Year One, $171k; Year Two, $108k; and Year Three, $18k.

However, the proposed program is expected to be financially viable long term. Given a reasonably likely estimate of enrollment and current in-state/out-of-state tuition pricing, the program is expected to generate positive cash flow in the third year after program launch (with funding from the Education Innovation Grant for year 1 development). Program marketing may be able to improve program financial performance beyond the above Base Case by achieving higher than budgeted enrollment from a strong national market that was identified in the preceding Market Study, completed September 2013.
Request for Approval of a New Named Option in the Existing Master of Engineering Degree, Civil and Environmental Engineering Major, in Environmental Engineering

Supplemental Materials

1.0 College of Engineering Master of Engineering Oversight Committee Approval
2.0 Department of Civil and Environmental Engineering Approval
3.0 Department of Engineering Professional Development Approval
4.0 Support Letter, Nelson Institute for Environmental Studies
MEMORANDUM

To: Marty Anne Gustafson, Program Director, Engineering Professional Development

From: Barry Van Veen, Lynn H. Matthias Professor and Chair Master of Engineering Oversight Committee

Date: February 20, 2014

Re: Master of Engineering, Environmental Engineering (M.Eng EnvE)

Cc: Michael Doran, Steve Cramer

This memorandum is to report that the College of Engineering Master of Engineering Oversight Committee approved and endorsed the Master of Engineering, Environmental Engineering (M.Eng EnvE) degree program at its meeting held on February 19, 2014.

Please contact me if you have any questions.
January 31, 2014

TO: Marty Gustafson, Program Director, Engineering Professional Development

FROM: Phil O'Leary, Professor and Chair

SUBJECT: Master of Engineering in Environmental Engineering (MEng EnvE)

This memorandum is to report that the Executive Committee of the Department of Engineering Professional Development (EPD) approved and endorsed the Master of Engineering, Environmental Engineering (MEng EnvE) degree program at their meeting held on 31 January 2014.

Cc: Craig Benson
    Michael Doran
    Wayne Pferdehirt
MEMORANDUM

To: Marty Anne Gustafson, Program Director, Engineering Professional Development

From: Craig H. Benson, Wisconsin Distinguished Professor and Chair

Date: 22 January 2014

Re: Master of Engineering, Environmental Engineering (M.Eng EnvE)

Cc: File, Michael Doran, Liz Funk-Smith

This memorandum is to report that the faculty of the Department of Civil and Environmental Engineering (CEE) approved and endorsed the Master of Engineering, Environmental Engineering (M.Eng EnvE) degree program at the CEE faculty meeting held on 21 January 2014.

Please contact me if you have any questions.
April 1, 2014

Philip R. O’Leary, PhD, PE  
Professor and Chair  
Department of Engineering Professional Development  
432 North Lake Street  
Madison, Wisconsin 53706

Dear Dr. O’Leary,

We believe that your proposed on-line program in Environmental Engineering provides a useful supplement to offerings in the environment across campus, including our own. We therefore have no hesitation in endorsing it.

Your curriculum is rigorous, and we note that it incorporates courses taught by three persons who have been very involved in the teaching and research programs of the Nelson Institute, Professors Potter, Eagan, and Ozdogan. Several others are long-time affiliates of the Nelson Institute. This gives us confidence that the training of your environmental engineers will include perspectives from person well-versed in a comprehensive view of the environment.

We are strongly supportive of your proposal and wish you the best.

With best wishes,

Paul Robbins  
Professor and Director  
Nelson Institute for Environmental Studies