ESF Curriculum Proposal Form
Committee on Instruction - ESF Faculty Governance
Office of Instruction & Graduate Studies

Date: April 28, 2011
Department: ERE
Curriculum Title: Environmental Resources Engineering

☐ New curriculum and/or degree program OR ☐ Changes in existing curriculum(check all that apply):
☐ new program title      ☑ new courses added      ☐ new accreditation
☐ revised courses        ☑ change in total cr. hrs.     ☐ new assessment plan
☐ new course sequence    ☐ new program objectives     ☐ other significant change

Justification Narrative: please provide an explanatory narrative outlining the need or rationale for the new curriculum or program, or justifying the need to significantly change an existing curriculum (i.e. addressing emerging or changing societal demand, addressing changing technology, focusing on a new interdisciplinary body of knowledge, etc.)

In response to policy change by SUNY, we are proposing to modify the distribution of General Education Requirements within the ERE curriculum. We are amending the program to add a directed elective in Earth Sciences in lieu of a General Education Elective in the Fall semester of the Sophomore year. Students will elect one Earth Science-related course selected from a list of pre-approved courses, namely Introduction to Atmospheric Sciences; Meteorology, or Introduction to Soils. This modification will strengthen the ERE program for accreditation review by the Accreditation Board for Engineering and Technology (ABET) for programs in Environmental Engineering.
Consistent with SUNY GER, ERE students are required to have 27 credit hours of general education coursework in at least seven of the following nine subject areas to satisfy SUNY and the ERE program requirements: Basic Communication; Mathematics; Humanities; Natural Sciences; American History; Western Civilization; Other World Civilizations; The Arts; and Social Sciences. Current ERE Program requirements are sufficient to satisfy four of the General Education subject area requirements (12 credit hours): Basic Communication (CLL 190); Mathematics (APM 205); Natural Sciences (EFB 101) and Humanities (CLL 290). The addition of a three-credit hour directed earth sciences elective will provide depth in the Natural Sciences subject area. Students must complete nine (9) credits in at least three of these General Education subject areas: American History; Western Civilization; Other World Civilizations; The Arts; and Social Sciences. Students may pursue depth in one or more general education areas to meet the balance of the general education requirements.
We increased the program requirements by one credit hour to 126 credit hours. The additional credit hour is due to an addition of one credit hour to ERE 351 Thermodynamics, a required course which was formerly a two-credit hour course.

Institutional Impact:

Anticipated Enrollment: 30 per semester  Change from existing condition: 0

New Faculty or Staffing Requirements: Possible additional TA support or lab section in
New Technology and Classroom Resource
Demands:

FOR 345 Introduction to Soils
New Computing Resources Requirements:

New Accreditation Requirements:

New Assessment Requirements (explain & describe):

New Library Resources Requirements:

New Transportation Requirements:

New Forest Properties or Field Practicum Facilities Required:

Impacts on other Departments at ESF (please obtain and attach response from affected departments):

Impacts on Admissions (particularly transfer requirements and articulation agreements; please obtain and attach response from Admissions if an impact is anticipated)

List courses taught outside the Department at ESF:

List courses taught outside the Department at SU:

- Accessory Instruction credit hours at SU required per student in this curriculum:
- Accessory Instruction credit hours required per semester by this curriculum
- Change in Accessory Instruction needs over current programs and curricula

As the General Education requirements are relaxed, we would expect that AI would decrease.

Increased enrollment of up to 20 per year in FOR 345, FCH399, or FOR 338

FOR345, FCH399, FOR338

Catalog Curriculum Narrative:

Please provide a narrative description of the program, the broad program objectives and learning outcomes, and a curriculum course outline using the precise format proposed for/or currently used in the ESF catalog (if revising an existing program or curriculum proposal, please attach a copy of the original MS Word file with revisions shown in “track changes”):

Follows Below

Curriculum Transition Plan:
Please provide a narrative description of your plan for transitioning from your existing curriculum to the proposed new curriculum. Please provide specific dates for implementing curriculum changes, overlap periods where old and new curricula may exist simultaneously, and final phase out of old curricula. Please also include impacts and mitigating considerations for students in mid-program during implementation, impacts of changes in semester delivery of existing courses, addition of new courses within a particular semester, etc.

We will publish this curriculum on the AY2011-2012 Catalog. Increased enrollment in courses listed above would be expected no earlier than Fall2012. We would expect decreased enrollment in General Education courses in an equal amount.

**Catalog Curriculum**

**Bachelor of Science in Environmental Resources Engineering**

The primary objective of this degree program is to prepare qualified engineering graduates to operate with professional competence. A broad base of study in the fundamentals of engineering enables graduates to enter professional practices which focus on civil works as well as the use and protection of soil, water, air, and other renewable and non-renewable resources. The program is meant to educate professionals who will ensure sustainable development through engineering solutions that are environmentally responsible.

The objectives of the program are to prepare baccalaureate students who can successfully:

- Engage in professional engineering practice specializing in natural and designed environments
- Pursue graduate studies in environmental resources engineering, including ecological, geospatial and water resources engineering, and
- Expand and adapt their knowledge and skills to address the technological, environmental and social challenges of a changing world

Emphasis in this program is placed on applications in resource inventory, prediction, and evaluation; site analysis and development; environmental monitoring and impact assessment; environmental systems design, evaluation and management; pollution abatement and residuals management; and environmental site remediation. The importance of measuring and evaluating spatial environmental parameters provides unique opportunities for students to pursue professional careers involving the conceptualization, design and maintenance of geographically referenced environmental resource information.

The undergraduate curriculum in environmental resources engineering consists of two broad categories of courses. The general education component provides students with knowledge and skills that are useful and important for all educated persons. The second category, professional courses, provides students with direct preparation for a career in engineering and applied sciences.

The design of the Environmental Resource Engineering program is similar to many environmental engineering programs. Two years of core mathematics, natural science, engineering science and general education courses form the foundation for specialized upper division requirements in Water and Wastewater Treatment, Geotechnical Engineering, Hydrology and Hydraulics, Solid Waste Management, and Remote Sensing. In addition, the ERE curriculum allows students freedom to specialize in areas that reflect the faculty's strengths in Ecological Engineering, Geospatial Engineering, and Water Resource Engineering.

The curriculum is developed to include hands-on, design-oriented courses starting in the freshman year, and allows students to explore advanced topics of interest through senior engineering design electives. Many of our students use these engineering design electives to focus on Department's three core strengths. Graduates of the program enjoy many benefits derived from their capstone-curriculum course in engineering planning and design. This project-oriented course serves to help the student integrate four years of engineering education to solve complex design problems commonly encountered in professional practice.
Students may be admitted directly as first-year freshman students at ESF or through a variety of transfer options. To enter the curriculum at the sophomore or junior level, a transferring student must have acceptable college credit in the designated coursework areas or suitable coursework substitutions. Regardless of which way students enter ESF, they must complete both the general and professional education requirements. Students having advanced placement credits are encouraged to work closely with their adviser in order to best prepare for upper-division electives in technology, science, design and/or management.

Students with an interest in graduate study can plan their undergraduate studies along an individualized track to prepare for ESF’s graduate program in environmental resource engineering. Students who qualify will be admitted to a quality graduate program with minimal interruption in their studies. In addition, qualified graduates in search of additional education find ready acceptance to top engineering graduate schools throughout the country.

**Undergraduate Program Requirements**

**Lower Division Required Courses (58 credits)**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APM 485</td>
<td>Differential Equations for Engineers and Scientists 3</td>
</tr>
<tr>
<td>CLL 190</td>
<td>Writing and the Environment 3</td>
</tr>
<tr>
<td>CLL 290</td>
<td>Writing, Humanities and the Environment 3</td>
</tr>
<tr>
<td>EFB 101/102</td>
<td>General Biology I &amp; Laboratory 4</td>
</tr>
<tr>
<td>GNE 172</td>
<td>Statics and Dynamics 4</td>
</tr>
<tr>
<td>GNE 273</td>
<td>Mechanics of Materials 3</td>
</tr>
<tr>
<td>FCH 150/151</td>
<td>General Chemistry I and Laboratory 4</td>
</tr>
<tr>
<td>FCH 152/153</td>
<td>General Chemistry II and Laboratory 4</td>
</tr>
<tr>
<td>ERE 132</td>
<td>Orientation Seminar: Environmental Resources Engineering Required for students who enter as freshmen or transfers. 1</td>
</tr>
<tr>
<td>ERE 133</td>
<td>Introduction to Engineering Design 3</td>
</tr>
<tr>
<td>ERE 275</td>
<td>Ecological Engineering I 3</td>
</tr>
</tbody>
</table>

*Comment [LUQ1]: The CLL prefixes will all need to change.*

*I’m not sure if that is being done at a higher level, but the acronym is being changed to EWP.*
### Lower Division Electives (9 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 321</td>
<td>Forest Ecology and Silviculture</td>
<td>3</td>
</tr>
<tr>
<td>APM 205</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>APM 206</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>APM 307</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>PHY 211/221</td>
<td>General Physics I and Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHY 212/222</td>
<td>General Physics II and Laboratory</td>
<td>4</td>
</tr>
</tbody>
</table>

General Education:

Consistent with SUNY GER, ERE students are required to have 27 credit hours of general education coursework in at least seven of the following nine subject areas to satisfy SUNY and the ERE program requirements: Basic Communication; Mathematics; Humanities; Natural Sciences; American History; Western Civilization; Other World Civilizations; The Arts; and Social Sciences. ERE Program requirements are sufficient to satisfy four of the General Education subject area requirements (12 credit hours): Basic Communication (CLL 190); Mathematics (APM 205); Natural Sciences (EFB 101) and Humanities (CLL 290). Students will elect one Earth Science-related course from a list of pre-approved courses, namely FCH 399 Introduction to Atmospheric Sciences; FOR 338 Meteorology, or FOR 345 Introduction to Soils. The directed earth sciences elective will provide depth in the Natural Sciences subject area. Students must complete nine (9) credits in at least three of these General Education subject areas: American History; Western Civilization; Other World Civilizations; The Arts; and Social Sciences. Students may pursue depth in one or more general education areas to meet the balance of the general education requirements.

### Upper Division Required Courses (41 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APM 395</td>
<td>Probability and Statistics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
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<td>--------------------------------------------------</td>
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</tr>
<tr>
<td>CIE 337</td>
<td>Introduction to Geotechnical Engineering</td>
<td>4</td>
</tr>
<tr>
<td>ERE 351</td>
<td>Basic Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ERE 371</td>
<td>Surveying for Engineers</td>
<td>4</td>
</tr>
<tr>
<td>ERE 440</td>
<td>Water Pollution Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ERE 335</td>
<td>Numerical and Computing Methods</td>
<td>3</td>
</tr>
<tr>
<td>ERE 340</td>
<td>Engineering Hydrology and Hydraulics</td>
<td>4</td>
</tr>
<tr>
<td>ERE 365</td>
<td>Principles of Remote Sensing</td>
<td>4</td>
</tr>
<tr>
<td>ERE 430</td>
<td>Engineering Decision Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ERE 468</td>
<td>Solid Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>ERE 489</td>
<td>Forest Engineering Planning and Design</td>
<td>3</td>
</tr>
<tr>
<td>MAE 341</td>
<td>Fluid Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Upper Division Electives (18 credits)**

**Engineering Elective**
An upper-division engineering course that is advisor-approved and provides depth in engineering analysis, design or synthesis.

Pre-approved SUNY ESF engineering elective courses are:
- ERE 412 River Form and Process,
- ERE 445 Hydrologic Modeling,
- ERE 448 Open Channel Hydraulics
- ERE 475 Ecological Engineering II,
- GNE 461 Air Pollution Engineering,
- ERE 496 and ERE 596 Special Topics courses must be pre-approved by the Department prior to registration
- ERE 496 Environmental Systems Engineering,
- ERE 496 Ecosystem Restoration Design,

Pre-approved Syracuse University courses that may be used to satisfy engineering electives include:
- CIE 331 Analysis of Structures and Materials,
- CIE 332 Design of Concrete Structures,
- CIE 338 Foundation Engineering,
- CIE 443 Transportation Engineering,
CIE 473 Transport Processes in Environmental Engineering,
Special Topics courses offered through Syracuse University’s L.C. Smith College of Engineering must be pre-approved by the Department prior to registration

500-599 Graduate courses designed expressly for areas of specialization in post-baccalaureate programs. Qualified undergraduate students may enroll with permission of the instructor.
ERE 511 Ecological Engineering in the Tropics,
ERE 527 Stormwater Management,
ERE 551 GIS for Engineers,

600-699 Graduate courses are designed expressly for advanced levels of specialization. Undergraduate students with a cumulative grade point average of 3.000 or better may enroll in these courses with an approved petition.
ERE 621 Spatial Analysis,
ERE 622 Digital Image Analysis,
ERE 674 Methods in Ecological Treatment
ERE 692 Remote Sensing of the Environment,
ERE 693 GIS-Based Modeling

Free Elective (unrestricted elective may be used for transfer credits or to pursue special interest courses) 3

General Education Course 3

General Education Course 3

Total minimum credits for the degree 126 credits