

# Program & Curriculum Approval

## Executive Summary

[Close This Window](#)

### Program Title: Ecological Engineering Minor

**Approval Status:** Waiting for Provost Approval

**Program Last Saved:** Nov 26, 2008 3:32:32 PM

**By:** Kathryn Younie

**NOTE:** The sample plan below may not include all possible course options. Check the program requirements for additional courses that can work with your four-year plan.

Jump down to: [General](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#)

### Completed Approvals:

<b>Submit Program</b> on 2008-11-26 by Kathryn Younie (youni001@umn.edu )	>	<b>Degree-Granting College for Institute of Technology</b> on 2008-11-26 by Pamela Klopfleisch (klopf001@umn.edu )
--	---	---

### General Information

<b>Campus:</b>	University of Minnesota, Twin Cities
<b>Career:</b>	Undergraduate
<b>Program type:</b>	Minor Related to a Major
<b>Program title (short):</b>	Ecological Engineering Minor
<b>Program title (long):</b>	Ecological Engineering Minor
<b>Additional terms:</b>	This program does not need any summer terms.
<b>Stakeholder college(s):</b>	Food, Agri & Nat Res Sci, Coll Technology, Institute of
<b>Degree-granting college(s):</b>	Technology, Institute of
<b>Approver college(s):</b>	Technology, Institute of
<b>Administrative college(s):</b>	Technology, Institute of
<b>Budgetary college(s):</b>	Food, Agri & Nat Res Sci, Coll : 100%
<b>Department(s):</b>	Bioproducts and Biosystems Engineering
<b>First term admitting students:</b>	Fall 2009
<b>Effective date:</b>	Fall 2009
<b>Degree:</b>	
<b>Catalog description:</b>	<p>Ecological Engineering is the design of sustainable systems that integrates traditional engineering concepts with fundamental ecological principles. These principles include resiliency, adaptation, and community dynamics. Ecological concepts are of fundamental importance in the designs of robust and sustainable systems that integrate human activities with the natural environment.</p> <p>Some examples of ecological engineering are: (1)</p> <ul style="list-style-type: none"> <li>• Ecosystem restoration and habitat design at multiple scales</li> <li>• Watershed management and enhancement</li> <li>• Integrated waste treatment systems and beneficial use of waste products</li> <li>• Phytoremediation and bioremediation</li> </ul>

- Industrial ecology
- Constructed wetlands and restored impaired wetlands
- Mitigation of non-point source contamination
- Wisely increasing ground water recharge through 'low impact' design and other methods

The Ecological Engineering minor is supported by the undergraduate programs of Bioproducts and Biosystems Engineering (BBE), Civil Engineering (CE), Geology and Geophysics (GEO), and possibly other engineering program. The program will be coordinated with the department of Ecology, Evolution and Behavior (EEB). The BBE department will be responsible for administrating the minor.

<b>RIASEC Codes:</b>	1. 2. 3.
<b>Field of Study:</b>	Math, Engineering, and Science
<b>Program contact's U of M Internet ID:</b>	shri
<b>Program contact's full name:</b>	Sridharan Ramaswamy
<b>Program contact's campus mail address:</b>	Bioproducts/Biosystems Engr, KaufL, 6130, 2004 Folwell Ave, St Paul, MN 55108
<b>Program contact's email address:</b>	shri@umn.edu
<b>Program contact's phone number:</b>	612/624-8797

## Narrative Materials

Hide this section

<b>Brief summary or overview of reason for proposed new program or rationale for changes:</b>	Ecological Engineering is the design of robust and sustainable systems that integrate human activities with the natural environment.
<b>Site(s) beyond the home campus where this program will be delivered:</b>	Twin Cities only
<b>External accrediting agency for this program:</b>	N/A (related major - Bioproducts and Biosystems Engineering program is accredited by ABET)
<b>External accrediting agency address:</b>	N/A
<b>External accrediting agency phone number:</b>	
<b>External accrediting agency Web site URL:</b>	
<b>Frequency of agency review:</b>	
<b>Scheduled time of upcoming review:</b>	
<b>Academic Exchange or Articulation Agreement:</b>	N/A
<b>Mission, Priorities and Interrelatedness:</b>	Ecological Engineering is the design of sustainable systems that integrates traditional engineering concepts with fundamental ecological principles. These principles include resiliency, adaptation, and community dynamics. Ecological concepts are of fundamental importance in the designs of robust and sustainable systems that integrate human activities with the natural environment. This minor is aimed at providing science and engineering students with the appropriate tools and skills necessary to address and solve 21st century ecological engineering issues. The proposed minor in Ecological Engineering is one step in complementing our offerings with majors in Bioproducts and Biosystems Engineering, Civil Engineering and related fields. All of the courses both required and elective courses are currently offered in various departments across the campus. Program quality is strongly tied to currently offered nationally ranked programs in several colleges across the campus.
<b>Need and Demand:</b>	With the recent approval of the Clean Water Legacy initiatives in the State and national level and resurgence in addressing water quality and proactive environmental

management, ecological science and engineering is poised for tremendous growth as has already been seen nationwide. This minor is aimed at providing science and engineering students with the appropriate tools and skills necessary to address and solve 21st century ecological engineering issues.

<b>Comparative Advantage:</b>	University of Minnesota with its extensive nationally renowned faculty expertise in environment and ecology and nationally ranked programs is uniquely positioned to educating the future scientists and engineers in this field. Minnesota with its leadership position in addressing water quality, air quality and a state mandate for the use of renewable energy provides additional comparative advantage relative to our peers. The proposed minor in Ecological Engineering is one step in complementing our offerings with majors in Bioproducts and Biosystems Engineering, Civil Engineering and related fields.
<b>Efficiency, Effectiveness, and use of Resources:</b>	The proposed minor with some minor revisions in course content and course titles has been redesigned to cover topics of interest related to ecological engineering. All of the courses both required and elective courses are currently offered in various departments across the campus. The minor program makes more effective use of our already available resources increasing the student enrollment in some of the courses.
<b>Program Quality and Assessment:</b>	Program quality is strongly tied to currently offered nationally ranked programs in several colleges across the campus. Since many of the courses proposed to be part of the minor are already offered and some are with minor revisions, the overall program quality is expected to continue to be very good as is the currently offered majors and programs. There is no separate assessment required for the minor, as the related majors are already accredited and will be subjected to periodic accreditation review process.
<b>Program Development:</b>	This is a collaborative proposal with participation faculty from several disciplines including Bioproducts and Biosystems Engineering (BBE), Civil Engineering (CE), Geology and Geophysics (GEO), and Ecology, Evolution and Behavior (EEB) Environmental Science (ESPM) and Forestry (FR). There is a general consensus and support for the ecological engineering minor proposal.

## Admission Requirements

Hide this section

<b>Enter the minimum courses or credits to be completed before admission, if applicable:</b>	No Courses or Credits
<b>Indicate students that are usually admitted to pre-major status before admission to this major:</b>	No students
<b>Enter the preferred minimum G.P.A. above 2.0 for students already admitted to the degree-granting college(s) and now seeking entry to the major, if applicable:</b>	No G.P.A. Requirement above 2.0.
<b>Enter the preferred minimum G.P.A. above 2.0 for students transferring from another U of M college (I.U.T.s), if applicable:</b>	No G.P.A. Requirement above 2.0.
<b>Enter the preferred minimum G.P.A. above 2.0 for students transferring from outside the University, if applicable:</b>	No G.P.A. Requirement above 2.0.
<b>Explanation of G.P.A. above 2.0 requirements:</b>	
<b>Explanation of other requirements to be completed before admission:</b>	Pursuing another major at the University of Minnesota.
<b>Required course(s):</b>	

[^ Return to top](#)

## Program Requirements

[Hide this section](#)

<b>Minor length in credits:</b>	19 to 20 credits
<b>How many semesters of a second language are required?</b>	0 semester(s)
<b>Specific language(s) required</b>	No Second Language
<b>Other requirements, if applicable:</b>	
<b>Required course(s):</b>	<b>Core Group Courses</b>

*Students should take at least one course in each of the three core areas of ecological sciences, hydrologic sciences, and ecological engineering design.*

*At least one course from this subgroup*

- [BIOL 3407](#) - Ecology, ENVT (3.0 cr)
- or [BIOL 3408W](#) - Ecology, ENVT, WI (3.0 cr)
- or [BIOL 3807](#) - Ecology, ENVT (4.0 cr)
- or [EEB 4068](#) - Plant Physiological Ecology (3.0 cr)
- or [LA 3204](#) - Landscape Ecology (3.0 cr)

*At least one course from this subgroup*

- [CE 4501](#) - Hydrologic Design (4.0 cr)
- or [BBE 5513](#) - Watershed Engineering (3.0 cr)

*At least one course from this subgroup*

- [BBE 4523](#) - Water Management Engineering (3.0 cr)
- or [BBE 5523](#) {Approval Pending}

### Additional Courses

*In addition to the core courses, the students must take 10 or more credits from the following list of courses.*

- [BBE 3023](#) - Engineering Principles of Soil-Water-Plant Processes (3.0 cr)
- or [BBE 4533](#) - Agricultural Waste Management Engineering (3.0 cr)
- or [BBE 4013](#) - Transport in Biological Systems (4.0 cr)
- or [BBE 5533](#) {Approval Pending}
- or [CE 3301](#) - Soil Mechanics I (3.0 cr)
- or [CE 3501](#) - Environmental Engineering, C/PE, ENVT (3.0 cr)
- or [CE 4562](#) - Environmental Remediation Technology (3.0 cr)
- or [CE 4351](#) - Groundwater Mechanics (3.0 cr)
- or [CE 4352](#) - Groundwater Modeling (3.0 cr)
- or [CE 4501](#) - Hydrologic Design (4.0 cr)
- or [CE 4502](#) - Water and Wastewater Treatment (3.0 cr)
- or [CE 4512](#) - Open Channel Hydraulics (4.0 cr)
- or [CE 4561](#) - Solid Hazardous Wastes (3.0 cr)
- or [CE 5541](#) - Environmental Water Chemistry (3.0 cr)
- or [CE 5581](#) - Water Resources: Individuals and Institutions (3.0 cr)
- or [EEB 3001](#) - Ecology and Society, ENVT (3.0 cr)
- or [EEB 3603](#) - Science, Protection, and Management of Aquatic Environments (3.0 cr)
- or [EEB 4014](#) - Ecology of Vegetation (3.0 cr)
- or [EEB 4609W](#) - Ecosystem Ecology, WI (3.0 cr)
- or [EEB 4611](#) - Biogeochemical Processes (3.0 cr)
- or [EEB 5601](#) - Limnology (3.0 cr)
- or [ESPM 3101](#) - Conservation of Plant Biodiversity, ENVT (3.0 cr)
- or [ESPM 3111](#) - Hydrology and Water Quality Field Methods (3.0 cr)
- or [ESPM 5111](#) - Hydrology and Water Quality Field Methods (3.0 cr)
- or [ESPM 3245](#) - Sustainable Land Use Planning and Policy, ENVT (3.0 cr)
- or [ESPM 3251](#) - Natural Resources in Sustainable International Development, ENVT, IP (3.0 cr)
- or [ESPM 3603](#) - Environmental Life Cycle Analysis (3.0 cr)
- or [ESPM 3604](#) - Environmental Management Systems and Strategy (3.0 cr)
- or [ESPM 4216](#) - Contaminant Hydrology (2.0 cr)
- or [ESPM 4608](#) - Bioremediation (2.0 cr)
- or [FR 5104](#) - Forest Ecology (4.0 cr)
- or [FR 5114](#) - Hydrology and Watershed Management (3.0 cr)
- or [FR 5204](#) - Landscape Ecology and Management (3.0 cr)

or [GEO 3005](#) - Earth Resources, C/PE, IP (3.0 cr)  
or [GEO 4631W](#) - Earth Systems: Geosphere/Biosphere Interactions, WI (3.0 cr)  
or [GEO 5205](#) - Fluid Mechanics in Earth and Environmental Sciences (3.0 cr)  
or [GEO 5108](#) - Principles of Environmental Geology (3.0 cr)  
or [GEO 5701](#) - General Hydrogeology (3.0 cr)  
or [SUST 3003](#) - Sustainable People, Sustainable Planet, ENVT, C/PE (3.0 cr)

## Sub-plans

Hide this section

**Sub-plan requirement for  
this program:** No

[^ Return to top](#)

# Program & Curriculum Approval

## General Information

[Home](#) | [Search](#) | [View Executive Summary](#) | [Log Out](#)

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)

### Program Title: Ecological Engineering Minor

**Approval Status:** Waiting for Provost Approval

**Program Last Saved:** Nov 26, 2008 3:32:32 PM

**By:** Kathryn Younie

**NOTE:** The sample plan below may not include all possible course options. Check the program requirements for additional courses that can work with your four-year plan.

### General Information

<b>Campus:</b>	University of Minnesota, Twin Cities
<b>Career:</b>	Undergraduate
<b>Program type:</b>	Minor Related to a Major
<b>Program title (short):</b>	Ecological Engineering Minor
<b>Program title (long):</b>	Ecological Engineering Minor
<b>Effective term:</b> (When students will first begin courses under this version of the program)	Fall 2009
<b>Additional terms:</b>	The program is 8 semesters (4.0 years) long. This program does not need any summer terms.
<b>Stakeholder college(s):</b>	Food, Agri & Nat Res Sci, Coll Technology, Institute of

### Details

<b>Degree-granting college(s):</b>	Institute of Technology
<b>Approver college(s):</b>	Institute of Technology
<b>Administrative college(s):</b>	Institute of Technology
<b>Budgetary college(s):</b>	100 % : College of Food, Agricultural and Natural Resource Sciences 0 % : Institute of Technology
<b>Department(s) :</b>	Bioproducts and Biosystems Engineering
<b>First term admitting students:</b>	<b>Fall 2009</b>
<b>Catalog description:</b>	<p>Ecological Engineering is the design of sustainable systems that integrates traditional engineering concepts with fundamental ecological principles. These principles include resiliency, adaptation, and community dynamics. Ecological concepts are of fundamental importance in the designs of robust and sustainable systems that integrate human activities with the natural environment.</p> <p>Some examples of ecological engineering are: (1)</p> <ul style="list-style-type: none"> <li>• Ecosystem restoration and habitat design at multiple scales</li> <li>• Watershed management and enhancement</li> <li>• Integrated waste treatment systems and beneficial use of waste products</li> <li>• Phytoremediation and bioremediation</li> <li>• Industrial ecology</li> <li>• Constructed wetlands and restored impaired wetlands</li> <li>• Mitigation of non-point source contamination</li> <li>• Wisely increasing ground water recharge through 'low impact' design and other methods</li> </ul> <p>The Ecological Engineering minor is supported by the undergraduate programs of Bioproducts and Biosystems Engineering (BBE), Civil Engineering (CE), Geology and Geophysics (GEO), and possibly other engineering program. The program will be coordinated with the department of</p>

Ecology, Evolution and Behavior (EEB). The BBE department will be responsible for administrating the minor.

**RIASEC Codes:**

1. 2. 3.

**Field of Study:**

Math, Engineering, and Science

**Program contact's U of M**

shri

**Internet ID:**

**Program contact's full name:** Sridharan Ramaswamy

**Program contact's campus mail address:** Bioproducts/Biosystems Engr, KaufL, 6130, 2004 Folwell Ave, St Paul, MN 55108

**Program contact's email address:** shri@umn.edu

**Program contact's phone number:** 612/624-8797

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)

# Program & Curriculum Approval

## Documentation/Narrative Material

[Home](#) | [Search](#) | [View Executive Summary](#) | [Log Out](#)

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)

### Program Title: Ecological Engineering Minor

**Approval Status:** Waiting for Provost Approval

**Program Last Saved:** Nov 26, 2008 3:32:32 PM

**By:** Kathryn Younie

**NOTE:** The sample plan below may not include all possible course options. Check the program requirements for additional courses that can work with your four-year plan.

### Narrative

**\*Brief summary or overview of reason for proposed new program or rationale for changes:** Ecological Engineering is the design of robust and sustainable systems that integrate human activities with the natural environment.

**Site(s) beyond the home campus where this program will be delivered:** Twin Cities only

**Enter the external accrediting agency for this program, if applicable:** N/A (related major - Bioproducts and Biosystems Engineering program is accredited by ABET)

**External accrediting agency address:** N/A

**External accrediting agency phone number:**

**If the agency has a Web site, please enter the URL:**

**How frequently is this program reviewed by the agency?** If "Other," describe the frequency below:

**When is the upcoming agency review, if scheduled?** Not scheduled.

**Academic Exchange or Articulation Agreement:** N/A

### 1. Mission, Priorities, and Interrelatedness

**\*Mission, Priorities and Interrelatedness:** Ecological Engineering is the design of sustainable systems that integrates traditional engineering concepts with fundamental ecological principles. These principles include resiliency, adaptation, and community dynamics. Ecological concepts are of fundamental importance in the designs of robust and sustainable systems that integrate human activities with the natural environment. This minor is aimed at providing science and engineering students with the appropriate tools and skills necessary to address and solve 21st century ecological engineering issues. The proposed minor in Ecological Engineering is one step in complementing our offerings with majors in Bioproducts and Biosystems Engineering, Civil Engineering and related fields. All of the courses both required and elective courses are currently offered in various departments across the campus. Program quality is strongly tied to currently offered nationally ranked programs in several colleges across the campus.

### 2. Need and Demand

**\*Need and Demand:** With the recent approval of the Clean Water Legacy initiatives in the State and national level and resurgence in addressing water quality and proactive environmental management, ecological science and engineering is poised for tremendous growth as has already been seen nationwide. This minor is aimed at providing science and engineering students with the appropriate tools and skills necessary to address and solve 21st century ecological engineering issues.

### 3. Comparative Advantage

**\*Comparative Advantage:** University of Minnesota with its extensive nationally renowned faculty expertise in environment and ecology and nationally ranked programs is uniquely positioned to educating the future scientists and engineers in this field. Minnesota with its leadership position in addressing water



quality, air quality and a state mandate for the use of renewable energy provides additional comparative advantage relative to our peers. The proposed minor in Ecological Engineering is one step in complementing our offerings with majors in Bioproducts and Biosystems Engineering, Civil Engineering and related fields.

#### 4. Efficiency, Effectiveness, and Use of Resources

**\* Efficiency, Effectiveness, and Use of Resources:** The proposed minor with some minor revisions in course content and course titles has been redesigned to cover topics of interest related to ecological engineering. All of the courses both required and elective courses are currently offered in various departments across the campus. The minor program makes more effective use of our already available resources increasing the student enrollment in some of the courses.

#### 5. Program Quality and Assessment

**\*Program Quality and Assessment:** Program quality is strongly tied to currently offered nationally ranked programs in several colleges across the campus. Since many of the courses proposed to be part of the minor are already offered and some are with minor revisions, the overall program quality is expected to continue to be very good as is the currently offered majors and programs. There is no separate assessment required for the minor, as the related majors are already accredited and will be subjected to periodic accreditation review process.

#### 6. Program Development

**\* Program Development:** This is a collaborative proposal with participation faculty from several disciplines including Bioproducts and Biosystems Engineering (BBE), Civil Engineering (CE), Geology and Geophysics (GEO), and Ecology, Evolution and Behavior (EEB) Environmental Science (ESPM) and Forestry (FR). There is a general consensus and support for the ecological engineering minor proposal.

### Budget and Planning

Complete as many segments of this form as are relevant for your program. All responses should reflect ONLY new or additional resources required to mount the program, or new revenues to be gained from the program. The year-by-year responses should reflect cumulative (additive) information; that is, each year should show the total for that stage in the program, not just the total for the year.

<b>Students</b>	<b>Year 1 (Startup)</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Expected number of students</b>	5	10	15	20	25
<b>Expected number of graduates</b>		5	7	10	12
<b>Staffing</b>	<b>Year 1 (Startup)</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>New/Additional faculty FTE</b>	0.0	0.0			
<b>New/Additional staff FTE</b>	0.0	0.0			
<b>New/Additional administrator FTE (e.g. DGS)</b>	0.0	0.0			
<b>New/Additional grad assistants/other student FTE</b>	0.0	0.0			
<b>New/Additional consultants/adjuncts FTE</b>	0.3	0.3	0.3	0.3	0.3
<b>Space Requirements</b>	<b>Year 1 (Startup)</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Number of new/additional lecture sections</b>					
<b>Average number of students per lecture section</b>					
<b>Number of new/additional lab sections</b>					
<b>Average number of students per lab section</b>					
<b>Number of</b>					

**discussion/recitation sections**

**Average number of students per discussion/recitation section**

**New faculty/staff offices needed**

**Off campus rental (sq. ft)**

<b>Revenues (new)</b>	<b>Year 1 (Startup)</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>State O and M Tuition</b>	9807	19615			
<b>Fees</b>					
<b>Gifts/Endowments</b>					
<b>Grants/Contracts</b>					
<b>Other</b>					
<b>Total:</b>					
<b>To recalculate the total, save this page.</b>	9807	19615	0	0	0

<b>Expenses (new)</b>	<b>Year 1 (Startup)</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Faculty costs</b>					
<b>Staff costs</b>					
<b>Grad assistant/other student costs</b>					
<b>Administrator costs</b>					
<b>Consultant/adjunct costs</b>	5000	6000			
<b>Technology</b>					
<b>Equipment and depreciation</b>					
<b>Supplies</b>					
<b>Total:</b>					
<b>To recalculate the total, save this page.</b>	5000	6000	0	0	0

**Other**

**Other Program Assumptions** (e.g., transfer of effort from other colleges, new funding sources)

Regarding new revenues, beginning with Year 3, estimate a corresponding increase over the next years based on prevailing tuition rate. Regarding consultant/adjunct costs, beginning with Year 3 estimate adjustment based on inflation.

**No Additional Costs.**

If you are projecting no additional costs, please explain (i.e., what will you stop doing so that you can do this program)

The courses are currently being offered by regular faculty and one adjunct faculty; the proposed minor will increase the student enrollment and hence increase the revenue at no additional costs (other than minimal compensation for adjunct).

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)

# Program & Curriculum Approval

## Admission Requirements

[Home](#) | [Search](#) | [View Executive Summary](#) | [Log Out](#)

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)

### Program Title: Ecological Engineering Minor

**Approval Status:** Waiting for Provost Approval

**Program Last Saved:** Nov 26, 2008 3:32:32 PM

**By:** Kathryn Younie

**NOTE:** The sample plan below may not include all possible course options. Check the program requirements for additional courses that can work with your four-year plan.

### Admission Requirements

**Is there a minimum number of courses or credits to be completed before admission?** No Courses or Credits

Number of courses or credits:

**Are any students usually admitted to pre-major status before admission to this major?** No students

**Is there a preferred minimum G.P.A. above 2.0 for students already admitted to the degree-granting college(s) and now seeking entry to the major?** No G.P.A. Requirement above 2.0.

Preferred G.P.A.:

**Is there a preferred minimum G.P.A. above 2.0 for students transferring from another U of M college (I.U.T.s)?** No G.P.A. Requirement above 2.0.

Preferred G.P.A.:

**Is there a preferred minimum G.P.A. above 2.0 for students transferring from outside the University?** No G.P.A. Requirement above 2.0.

Preferred G.P.A.:

**Explanation of G.P.A. above 2.0 requirements:**

**Explanation of other requirements to be completed before admission:** Pursuing another major at the University of Minnesota.

**Required course(s):**  **Any course group or subgroup enclosed by square brackets [] has been designated as a checkpoint.**

**No course groups currently exist.**

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)

# Program & Curriculum Approval

## Program Requirements

[Home](#) | [Search](#) | [View Executive Summary](#) | [Log Out](#)

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)

### Program Title: Ecological Engineering Minor

**Approval Status:** Waiting for Provost Approval

**Program Last Saved:** Nov 26, 2008 3:32:32 PM

**By:** Kathryn Younie

**NOTE:** The sample plan below may not include all possible course options. Check the program requirements for additional courses that can work with your four-year plan.

### Program Requirements

**Minor length in credits:** 19 to 20

**How many semesters of a second language (or equivalent proficiency) are required for this degree?** 0

**If appropriate, specify the second language required:** No Second Language

**Other requirements, if applicable:**

**Required course(s):**  **Any course group or subgroup enclosed by square brackets [] has been designated as a checkpoint.**

[Show Course Group/List Details](#)

#### Course Group Name: Core Group Courses

**Course Group Description:** Students should take at least one course in each of the three core areas of ecological sciences, hydrologic sciences, and ecological engineering design.

#### Students should take:

((BIOL 3407 or BIOL 3408W or BIOL 3807 or EEB 4068 or LA 3204) and (CE 4501 or BBE 5513) and (BBE 4523 or **BBE 5523 {Approval Pending}** ))

AND

#### Course Group Name: Additional Courses

**Course Group Description:** In addition to the core courses, the students must take 10 or more credits from the following list of courses.

#### Students should take:

(BBE 3023 or BBE 4533 or BBE 4013 or **BBE 5533 {Approval Pending}** or CE 3301 or CE 3501 or CE 4562 or CE 4351 or CE 4352 or CE 4501 or CE 4502 or CE 4512 or CE 4561 or CE 5541 or CE 5581 or EEB 3001 or EEB 3603 or EEB 4014 or EEB 4609W or EEB 4611 or EEB 5601 or ESPM 3101 or ESPM 3111 or ESPM 5111 or ESPM 3245 or ESPM 3251 or ESPM 3603 or ESPM 3604 or ESPM 4216 or ESPM 4608 or FR 5104 or FR 5114 or FR 5204 or GEO 3005 or GEO 4631W or GEO

5205 or GEO 5108 or GEO 5701 or SUST 3003)

**Focus course groups:**  **Title for this set of focuses:** (limited to 100 characters)

**Level of focuses:**

Upper Division Focuses

**Description for this set of focuses:** (limited to 500 characters)

Use of the "focus" course group section is optional. Enter requirements as "focus" course groups when:

- students must choose one group of courses from a selection of two or more groups of courses to complete specific requirements;
- the groups of courses are not a sub-plan and will not have a sub-plan code.

**Any course group or subgroup enclosed by square [] brackets has been designated as a checkpoint.**

**No course groups currently exist.**

[General Information](#) | [Narrative](#) | [Admission](#) | [Program](#) | [Sub-plan](#) | [Sample Plan](#) | [Checkpoint Chart](#) | [Executive summary \(new window\)](#)