PC Rossin College of Engineering and Applied Science
Department of Civil & Environmental Engineering

Undergraduate Course and Curriculum Changes

B.S. Environmental Engineering Program

Proposed Program Change

1. **Name and summary of current program:**

   B.S. Environmental Engineering

   The mission of our Environmental Engineering Bachelor of Science degree program is to educate students in the principles and methods essential to the practice and advancement of the emerging interdisciplinary field of environmental engineering. The program is proactive and will continue to incorporate new and emerging paradigms in all aspects of teaching and education while maintaining rigorous standards in traditional approaches to engineered solutions of environmental problems. Graduates of the program will possess technical expertise to maintain a healthy balance between societal welfare, economic growth and the environment surrounding us.

2. **Proposed program changes (as they will appear in the catalog):**

   See Attachment A (proposed changes) and Attachment B (current catalog entry)

3. **Description of proposed change(s):**

   a. EES 31 will be removed as a required environmental biology course, and the students will be required to choose one course from a list of approved Environmental Biology Requirement (EBR) courses. Due to restructuring in the EES curriculum, EES 31 is no longer being taught, while additional courses have been added.

   b. Move CEE 202 to second semester, Junior year and move HSS elective to first semester, Senior year.

   c. Rename the Earth Science Elective to the Earth Science Requirement

4. **Rationale for proposed change(s):**

   a. EES 31 is no longer being taught. Additionally, there is now a number of courses in environmental biology available at Lehigh that meet the ABET criteria for an environmental biological science course, including EES 25 The Environment and Living Systems and EES 152 Ecology. The rationale for this proposed change is to offer the students an option as to which environmental biology course they would like to take.

   b. Due to changes in the Civil Engineering program, CEE 202 Civil Engineering Planning and Economics is being moved to the Spring semester. The swap of CEE 202 and the HSS requirement between Spring and Fall semesters is to account for this change.

   c. For clarity with the students, the term "elective" is being replaced with the term "requirement"

5. **Academic Impact Statement:**

   a. **Is this proposed program change interdisciplinary?**

      Yes, in that it includes courses outside of CEE.

b. **Identify any known effects of the proposed program change on other programs at the University.**

The students who would have normally taken EES 31 will now take other EES ecology courses.

c. **If there are known effects, individuals in charge of the affected programs must be consulted about the proposed program change and the following information provided:**

(1) **Who was consulted?**

Earth and Environmental Sciences – Frank Pazzaglia, Chair.

(2) **Is the proposed program change acceptable to the affected programs?**

Yes.

(3) **Will any changes be required in the affected programs? If so, describe.**

No.

d. **Identify any known effects of the proposed program change on the University's commitment to diversity.**

No effects

6. **Resource Impact Statement:**

a. **Provide each of the following:**

(1) **Library impact statement** – No impact

(2) **Computer impact statement** – No impact

(3) **Faculty impact statement** – No impact

(4) **Facilities impact statement** – No impact

b. **Provide a statement indicating who will assume financial responsibility for any new resources required:**

No new resources are required.

Department of Civil & Environmental Engineering

Proposed Course Change

1. **Proposed course changes (as they will appear in the catalog):**

   CEE 375 (CHE 375) Environmental Engineering Processes (3) Fall
   Processes applied in environmental engineering for air pollution control, treatment of drinking water, municipal wastewater, industrial wastes, hazardous/toxic wastes, and environmental remediation. Kinetics, reactor theory, mass balances, application of fundamental physical, chemical and biological principles to analysis and design. Prerequisite: CEE 170 or equivalent.

   Also, see Attachments A and B.

2. **Description of proposed change(s):**

   CEE 276 will have its course number changed to CEE 375.

3. **Rationale for proposed change(s):**

   The change from a 276 to 375 course is to align the course number with the level of difficulty of the course material.

4. **Academic Impact Statement:**

   a. **Is this proposed program change interdisciplinary?**

      Yes, in that the course is cross-listed as a CHE course.

   b. **Identify any known effects of the proposed program change on other programs at the University.**

      No known effects.

   c. **If there are known effects, individuals in charge of the affected programs must be consulted about the proposed program change and the following information provided:**

      (1) **Who was consulted?**

      Anthony McHugh

      (4) **Is the proposed program change acceptable to the affected programs?**

      Yes.

      (5) **Will any changes be required in the affected programs? If so, describe.**

      No.

   d. **Identify any known effects of the proposed program change on the University's commitment to diversity.**

      No effects

5. **Resource Impact Statement:**

   a. **Provide each of the following:**

      (1) **Library impact statement** – No impact

      (3) **Computer impact statement** – No impact

      (3) **Faculty impact statement** – No impact

      (4) **Facilities impact statement** – No impact

   b. **Provide a statement indicating who will assume financial responsibility for any new resources required:**

      No new resources are required.

Department of Civil & Environmental Engineering

Proposed Course Change

1. Current course number, title, course description, and credits:

CEE 171. (CHE 171, ES 171) Fundamentals of Environmental Technology (4)
Pollution control technologies and how they work for water, air, and solid wastes. Assessment and management of risk as applied to remediation of contaminated wastes. Role of life cycle analysis of products in risk reduction. Technologies leading to sustainable environment. Government policies and regulations, including litigation and Best Available Technology. Prerequisite: one advanced science course or permission of instructor. Not available to students in RCEAS.

2. Proposed course number, title, course description, and credits (as it will appear in course catalogue):

CEE 171. (CHE 171, EMC 171, ES 171) Fundamentals of Environmental Technology (4)
Introduction to water and air quality, water, air and soil pollution. Chemistry of common pollutants. Technologies for water purification, wastewater treatment, solid and hazardous waste management, environmental remediation, and air quality control. Global changes, energy and environment. Constraints of environmental protection on technology development and applications. Constraints of economic development on environmental quality. Environmental life cycle analysis and environmental policy. Prerequisite: EES (ES) 002, or one advanced science course or permission of instructor. Not available to students in RCEAS.

3. Nature of proposed change(s)

A. Course title change? If so, provide rationale below:

No change

B. Course number change? If so, provide rationale below:

No change

C. Change in course credits? If so, provide rationale below:

No change

D. Change in course description? If so, provide rationale below:

The new course description combines the major topics of both CEE 171 and EMC 196.

E. Other change(s)? If so, please describe below and provide rationale for each change.

No other change is proposed.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement, if provided by LTS).

No Impact

(2) Computer impact statement (attach statement, if provided by LTS).

No Impact

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty).

No impact is anticipated

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

A larger classroom is needed. Other impact on facilities is negligible.

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

No new resources are required.

Attachment C. Proposed catalog entry for the Environmental Engineering program (pages 163-164 in 2008-2009 catalog). Changes are highlighted in Yellow.

Recommended Sequence of Courses, B.S. in Environmental Engineering

The normal freshman engineering year is 29 credits (see Section III). The HSS Advanced Requirement of 13 credits is shown below as three 3-credit courses and one 4-credit course. Other options are possible.

Sophomore year, first semester (17 credit hours)

MATH 23	Calculus III (4)
CHEM 51	Organic Chemistry I (3)
CHEM 53	Organic Chem Lab (1)
MECH 2 or 3	Elementary Engineering Mechanics (3)
CEE 12	Civil Engineering Statistics (2)
ECO 1	Principles of Economics (4)

Sophomore year, second semester (18 credit hours)

MATH 205	Linear Methods (3)
PHY 21	Intro Physics II (4)
PHY 22	Intro Physics II Laboratory (1)
CEE 170	Intro. Environmental Engr. (4)
CEE 272	Environmental Risk Assessment (2)
HSS*	Humanities/Soc. Sciences Elective (4)

Junior year, first semester (16 credit hours)

CEE 121	Mechanics of Fluids (3)
CEE 142	Soil Mechanics (3)
CEE 375	Environmental Engineering Processes (3)
CHE 31	Matl. & Energy Bal. of CHE Process (3)
ESR	*** Earth Science Requirement (3)
EES 22	Exploring Earth (1)

Junior year, second semester (17 credit hours)

CEE 222	Hydraulic Engineering (3)
CEE 274	Environmental Water Chemistry (3)
CHE 60	Unit Ops Survey (3)
CEE 275	Enviro-Geo-Hydraulics Lab (2)
CEE 202	CEE Planning and Engr. Economics (3)
EBR	**** Environmental Biology Requirement (3)

Senior year, first semester (17 credit hours)

CEE 203	Professional Development (2)
CEE 378	Solid & Haz. Waste Management (3)
CEE 379	Environmental Case Studies (3)
TE	**Technical Elective (3)
HSS*	Humanities/Soc. Sciences Elective (3)
FE	Free Elective (3)

Senior year, second semester (18 credit hours)

CEE 377	Environmental Engr. Project (3)
TE	**Technical Electives (6)
HSS	*Humanities/Social Sci. Elective (6)
FE	Free Elective (3)

** HSS Advanced Requirement is 13 credits, four credits of which must be an approved environmental studies course; list of approved courses available from CEE department.*

*** 9 technical elective credits approved by the academic advisor to satisfy proficiency in four focus areas of water supply and resources, environmental chemistry, waste management and biological processes; approved list available from CEE department.*

**** Earth Science Requirement; list of approved courses available from CEE department.*

***** Environmental Biology Requirement; list of approved courses available from CEE department.*

A total of 132 credits is required for the bachelor's degree in Environmental Engineering.

Attachment D. Current catalog entry for the Environmental Engineering program (pages 163-164 in 2008-2009 catalog).

Recommended Sequence of Courses, B.S. in Environmental Engineering

The normal freshman engineering year is 29 credits (see Section III). The HSS Advanced Requirement of 13 credits is shown below as three 3-credit courses and one 4-credit course. Other options are possible.

Sophomore year, first semester (17 credit hours)

MATH 23	Calculus III (4)
CHEM 51	Organic Chemistry I (3)
CHEM 53	Organic Chem Lab (1)
MECH 2 or 3	Elementary Engineering Mechanics (3)
CEE 12	Civil ENGR. Statistics (2)
ECO 1	Principles of Economics (4)

Sophomore year, second semester (18 credit hours)

MATH 205	Linear Methods (3)
PHY 21	Intro Physics II (4)
PHY 22	Intro Physics II Laboratory (1)
CEE 170	Intro. Environmental ENGR (4)
CEE 272	Environmental Risk Assessment (2)
HSS*	Humanities/Soc. Sciences Elective (4)

Junior year, first semester (16 credit hours)

CEE 121	Mechanics of Fluids (3)
CEE 142	Soil Mechanics (3)
CEE 276	Environmental Engineering Processes (3)
CHE 31	Matl. & Energy Bal. of CHE Process (3)
EES	*** Earth Science Elective (3)
EES 22	Exploring Earth (1)

Junior year, second semester (17 credit hours)

CEE 222	Hydraulic Engineering (3)
CEE 274	Environmental Water Chemistry (3)
CHE 60	Unit Ops Survey (3)
CEE 275	Enviro-Geo-Hydraulics Lab (2)
HSS*	Humanities/Soc. Sciences Elective (3)
EES 31	Intro. Env/Organismal Biology (3)

Senior year, first semester (17 credit hours)

CEE 202	CEE Planning and Engr. Economics (3)
CEE 203	Professional Development (2)
CEE 378	Solid & Haz. Waste Management (3)
CEE 379	Environmental Case Studies (3)
TE	**Technical Elective (3)
FE	Free Elective (3)

Senior year, second semester (18 credit hours)

CEE 377	Environmental Engr. Project (3)
TE	**Technical Electives (6)
HSS	*Humanities/Social Sci. Elective (6)
FE	Free Elective (3)

** HSS Advanced Requirement is 13 credits, four credits of which must be an approved environmental studies course; list of approved courses available from CEE department.*

*** 9 technical elective credits approved by the academic advisor to satisfy proficiency in four focus areas of water supply and resources, environmental chemistry, waste management and biological processes; approved list available from CEE department.*

**** Earth Science Elective; list of approved courses available from CEE department.*

A total of 132 credits is required for the bachelor's degree in Environmental Engineering.