Chemical Engineering
Proposed Program Changes

Name and summary of the program: B.S. in Chemical Engineering

Proposed program changes (as they appear in the current catalog); (highlighted areas are the subjects of this proposal)

Undergraduate curriculum in Chemical Engineering

Requirements of the Major – 131 credit hours are required for graduation with the degree of Bachelor of Science in chemical engineering

Freshman year, first semester (14-15 credits)

ENGL 1	Composition and Literature (3)
CHM 25	Introductory Chemical Principals and Laboratory (4)
PHY 11, 12	Introductory Physics I and Laboratory (5)
MATH 21	Calculus I (4)
ENGR 1	Engineering Computations (3) or
ENGR 5	Introduction to Engineering Practice (3)

Freshman Year, second semester (14-15 credits)

ENGL 2	Composition and Literature: Fiction, Drama, Poetry (3)
PHY 11, 12	Introductory Physics I and Laboratory (5) or
CHM 25	Introductory Chemical Principals and Laboratory (4)
MATH 22	Calculus II (4)
ENGR 5	Introduction to Engineering Practice (3) or
ENGR 1	Engineering Computations (3)

Sophomore Year, first semester (16 credit hours)

CHE 31	Material and Energy Balances of Chemical Processes (3)
CHM 31	Chemical Equilibria in Aqueous Systems (4)
PHY 21	Introductory Physics II (4)
PHY 22	Introductory Physics Laboratory II (1)
MATH 23	Calculus III (4)

Sophomore Year, second semester (18 credit hours)

CHE 44	Fluid Mechanics (3)
CHE 210	Chemical Engineering Thermodynamics (4)
CHE 179	Professional Development (1)
BIOS 41	Biology Core I: Cellular and Molecular (3)
MATH 205	Linear Methods (3)
	Elective (4)

Junior Year, first semester (18 credit hours)

CHE 151	Introduction to Heat Transfer (3)
CHE 201	Methods of Analysis in Chemical Engineering (3)
CHM 51	Organic Chemistry I (3)
CHM 53	Organic Chemistry Laboratory I (1)
CHM 343	Physical Chemistry Laboratory (1)
	Electives (7)

Junior Year, second semester (17 credit hours)

CHE 244	Mass Transfer and Separation Processes (3)
CHE 211	Chemical Reactor Design (3)
CHM 52	Organic Chemistry II (3)
	Electives (8)

Senior Year, first semester (18 credit hours)

CHM 341	Molecular Structure, Bonding and Dynamics (4)
CHE 202	Chemical Engineering Laboratory I (2)
CHE 233	Process Design I (3)
CHE 242	Introduction to Process Control and Simulation (3)
	Electives (6)

Senior Year, second semester (15 credit hours)

CHE 203	Chemical Engineering Laboratory II (2)
ECE 83	Principles of Electrical Engineering (3)
CHE 234	Process Design II (3)
	Electives (7)

There are five types of electives:

(1) Humanities/Social Sciences: See the requirements set by the P.C. Rossin College of Engineering and Applied Science (Section III). Note that ECO 1 is required, as well as two Freshman English courses.
(2) Three credit hours from approved courses in other engineering departments (BioE, CEE, CSE, EECS, IMSE, MEM, MSE).
(3) Chemistry: 3 credit hours of 300 – level or higher, or higher.
(4) Chemical Engineering: A total of 3 credit hours are required from among ChE 186, or 3xy, or 4xy. ChE 185 does not qualify.
(5) Free electives: 6 credit hours in any subject area.

Electives in (2) to (5) above can be combined with any technical minor in RCEAS.

Proposed program changes (as they will appear in the catalog); (highlighted areas are the subjects of this proposal)

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There are five types of electives:

(1) Humanities/Social Sciences: See the requirements set by the P.C. Rossin College of Engineering and Applied Science (Section III). Note that ECO 1 is required, as well as two Freshman English courses.
(2) Three credit hours from approved courses in other engineering departments (BioE, CEE, CSE, EECS, IMSE, MEM, MSE).
(3) Chemistry: 3 credit hours of CHM 300 – level or higher, or CHE 380.
(4) Chemical Engineering: 3 credit hours of CHE 300-level or higher.
(5) Free electives: 6 credit hours in any subject area.

Electives in (2) to (5) above can be combined with any technical minor in RCEAS.

Description of Proposed changes:

Proposed changes are the highlighted two lines above. It is proposed that only items (3) and (4) of Electives to be changed: current and proposed forms of those two items are shown below:

Current form of the item:

(3) Chemistry: 3 credit hours of 300 – level or higher, or higher.
(4) Chemical Engineering: A total of 3 credit hours are required from among CHE 186, or 3xy, or 4xy, CHE 185 does not qualify.

Proposed form of the items:

(3) Chemistry: 3 credit hours of CHM 300 – level or higher, or CHE 380.
(4) Chemical Engineering: 3 credit hours of CHE 300-level or higher.

Rationale for proposed changes:

Department would like to encourage select students to do a senior level research project (OSI) and would like to accept this research course credits to satisfy the CHM 300 level elective requirement.

Academic Impact:

Is this proposed new program interdisciplinary? No
Identify any known effects of the proposed new program on other programs at the University. There are no known effects.
If there are known effects, individuals in charge of the affected programs must be consulted about the new program and the following information provided:
Who was consulted? N/A
Is the proposed new program acceptable to all programs affected? N/A
Will any changes be required in the affected programs? If so, describe. N/A
Identify any known effects of the proposed new program on the University's commitment to diversity. No known effects on diversity.

Resource Impact:

Provide each of the following:

Library impact statement: No impact on library—OSI research course has been offered every year since 1982, this is just a chance in bean counting.
Computer impact statement: No known effects on computing
Faculty impact statement: No impact on faculty
Facilities impact statement: No impact on facilities

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

No cost is involved with this change.

RCEAS: Chemical Engineering

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

CHE 171 (CEE 171, EMC 171, ES171) 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.

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

The instructional mode will include a lecture format and demonstration lab modules.

3. Rationale for proposed new course:

The proposed course is needed to provide an opportunity to Arts & Science and Business College students to learn engineering view on environmental issues.

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

Yes, with CEE 171, ES 171and EMC 171

B. Identify any known effects of the proposed new program on other programs at the University.

Not that we anticipate

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

(1) Who was consulted?

N/A

(2) Is the proposed new program acceptable to all other programs affected?

N/A

(3) Will any changes be required in the affected programs? If so, please describe below:

No

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:

N/A

5. Resource Impact:

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

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

The course has already been offered by CEE Department, thus there will be no additional impact on Library

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

Given that this course has been taught by CEE Department no new computer impact is expected

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

The course will continue to be offered by CEE Department

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

This proposal has no new impact on facilities since the course has currently been offered by CEE Department

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

Course has already been offered by CEE Department

RCEAS: Chemical Engineering
Proposed Course Change

1. **Current course number and course description (from course catalog):**

ChE 207 (MATH 207) Introduction to Biomedical Engineering and Mathematical Physiology (3) Fall

Topics in human physiology and mathematical analysis of physiological phenomena, including the cardiovascular and respiratory systems, biomechanics, and renal physiology; broad survey of bioengineering. Independent study projects.

Prerequisites: MATH 205

2. **Proposed course number and course description (as it will appear in course catalog):**

ChE 3XX (MATH 3XX) Introduction to biomedical engineering and mathematical biology (3)

Study of human physiology, including the cardiovascular, nervous and respiratory systems, and renal physiology. Mathematical analysis of physiological processes, including transport phenomena. Mathematical models of excitation and propagation in nerve. Biomechanics of the skeletal muscle system. Mathematical models in population dynamics and epidemiology. Independent study projects.

Prerequisite: MATH 205.

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

Course number, title, and description changed.

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

MATH Department requested the change to update the course material and align the course number with the level of difficulty of the course material.

5. **Academic impact on programs affected by new course:**
   a. **Is the proposed course to be cross-listed?** Yes, this course is cross listed with MATH department.

   b. **Identify any known effects of the proposed new program on other programs at the University.**
   This course has already been offered—just the number is being changed—no change in resources.

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

   (1) Who was consulted? MATH Department— Garth Isaak -Associate Chair.

   (2) Is the proposed new program acceptable to all other programs affected? Yes

   (3) Will any changes be required in the affected programs? If so, please describe below: NO

   d. **Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:** N/A

6. **Resource Impact: Provide**

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

      (1) Library impact statement:

      The course has already been offered under a different number, thus there will be no additional impact on Library

      (2) Computer impact statement:

      Given that this course has been taught under different number, there will be no new computer impact.

      (3) Faculty impact statement:

      The course will continue to be offered by MATH Department as has been in the past. 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.

RCEAS: Chemical Engineering
Proposed Course Change

1. **Current course number and course description (from course catalog):**

ChE 276 (CEE 276) 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 enviroinmental remediation. Kinetics, reactor theory, mass balances, application of fundamental physical, chemical and biological principles to analysis and design.

Prerequisite: CEE 170 or equivalent.

2. **Proposed course number and course description (as it will appear in course catalog):**

ChE 375 (CEE 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 enviroinmental remediation. Kinetics, reactor theory, mass balances, application of fundamental physical, chemical and biological principles to analysis and design.

Prerequisite: CEE 170 or equivalent.

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

Course number changed from ChE 276 to ChE 375.

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

CEE Department requested the change to align the course number with the level of difficulty of the course material.

5. **Academic impact on programs affected by new course:**
   a. **Is the proposed course to be cross-listed?** Yes, this course is cross listed with CEE department.

   b. **Identify any known effects of the proposed new program on other programs at the University.**
   This course has already been offered—just the number is being changed—no change in resources.

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

   (1) Who was consulted? CEE Department—Arup Sengupta + Derick Brown.

   (2) Is the proposed new program acceptable to all other programs affected? Yes

   (3) Will any changes be required in the affected programs? If so, please describe below: NO

   d. **Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:** N/A

6. **Resource Impact: Provide**

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

      (1) Library impact statement:

      The course has already been offered under a different number, thus there will be no additional impact on Library

      (2) Computer impact statement:

      Given that this course has been taught under different number, there will be no new computer impact.

      (3) Faculty impact statement:

      The course will continue to be offered by CEE Department as has been in the past. 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.

RCEAS: Chemical Engineering

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

CHE 374 Environmental Catalysis (3)

Pollution emissions in the USA (NOx, SOx, NH_3, CO, VOCs, PM, heavy metals and persistent bioaccumulative chemicals) and their sources and fate. Fundamental concepts of catalysis (surface and their characterization, physical adsorption, surface reaction mechanisms and their kinetics). Application of catalysis to a wide range of environmental issues (catalytic combustion of VOCs, automotive catalytic converter, selective catalytic conversion of NOx, etc.)

Prerequisite: Senior standing and instructor approval

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

The instructional mode will include a lecture format meeting twice a week.

3. Rationale for proposed new course:

The proposed course has been taught under temporary number (ChE 398, Spring 2004-14 students. Spring 2005-30 students, and Fall 2008-8 students). It is time to make it permanent.

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

None

B. Identify any known effects of the proposed new program on other programs at the University.

None that we can anticipate

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

(1) Who was consulted? N/A.

(2) Is the proposed new program acceptable to all other programs affected? N/A

(3) Will any changes be required in the affected programs? If so, please describe below: NO

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below: N/A

5. Resource Impact:

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

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

The course has already been offered under temporary number, thus there will be no additional impact on Library

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

Given that this course has been taught under temporary number, no new computer impact is expected

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

The course will continue to be offered by ChE Department as elective to both Undergraduate and Graduate students. Frequency of the offering will depend on anticipated need and Departmental load.

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

This proposal has no new impact on facilities since the course has currently been offered under temporary number.

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

Course has already been offered by ChE Department. Department will be responsible for any new resources required.

RCEAS: Chemical Engineering

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

CHE 376 (ME 37) Energy: Issues & Technology (3)

Energy usage and supply, fossil fuel technologies, renewable energy alternatives and environmental impacts. The scope will be broad to give some perspective of the problems, but in-depth technical analysis of many aspects will also be developed.

Prerequisites: college-level introductory courses in chemistry, physics and mathematics and instructor approval

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

The instructional mode will include a lecture format meeting twice a week.

3. Rationale for proposed new course:

The proposed course has been taught once in Spring 2008 (36 students) and will be offered in Spring 2009 under ChE 350 Special Topics. The Department believes that it is time to make the course permanent.

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

Yes, with MEM Department.

B. Identify any known effects of the proposed new program on other programs at the University.

None that we can anticipate

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

(1) Who was consulted?

N/A

(2) Is the proposed new program acceptable to all other programs affected?

N/A

(3) Will any changes be required in the affected programs? If so, please describe below:

NO

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:

NO

5. Resource Impact:

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

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

No special requirements from Library are involved. Furthermore, the course has already been offered under Special Topics, thus there will be no additional impact on Library

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

No special computing requirements are involved. Furthermore, the course has already been taught under Special Topics, no new computer impact is expected

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

The course will continue to be offered by ChE Department as an elective to both Undergraduate and Graduate student. Frequency of the offering will be adjusted on anticipated need and Departmental load.

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

This proposal has no new impact on facilities since the course has currently been offered under Special Topics.

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

Course has already been offered by ChE Department. Department will be responsible for any new resources required.