

TO: Faculty of the Schools of Engineering

FROM: Faculty of the School of Chemical Engineering

RE: Changes in Curriculum and Course Offerings

The Faculty of the School of Chemical Engineering has approved the following curriculum changes and submits them for your approval.

I. SUMMARY OF CHANGES

The new curriculum reflects the changes made to the chemistry, mathematics and computer requirements of the freshman year.

1. The Freshman Engineering Department has added another chemistry sequence (CHM 123/124) for students who enter with a more advanced background in chemistry. The School of Chemical Engineering prefers that students complete the CHM 123/124 sequence; however, the CHM 115/116 sequence is also acceptable. References to CHM 135/136 have been removed as the CHM 123/124 sequence replaces CHM 135/136 as the more challenging chemistry sequence for Freshman Engineers.
2. The required math sequence is now a five course sequence: MA 165 (4), MA 166 (4), MA 261 (4), MA 265 (3), and MA 266 (3). (The MA 265/266 requirement provides a stronger background in linear algebra and differential equations than would be obtained with the previously required MA 262 course alone.)
3. CHE 320 and IE 343 have been switched in sequence with CHE 320 being moved from the sixth to the fourth semester and IE 343 being moved from the fourth to the sixth semester. The statistical modeling skills learned in CHE 320 are some of the first skills used by the coop students in their early work sessions, all juniors participating in a research project in CHE 411 and 412, and all students involved in summer internships. Moving this course earlier in the curriculum better prepares these students.
4. PHYS 241 has been moved to the fourth semester to allow room in a student's schedule for MA 265 in the third semester. MA 265 will give students a stronger base for CHE 320, Statistical Modeling, and provide the linear algebra needed in CHE 205.
5. In the fifth semester, the Physical Chemistry Laboratory was inadvertently named CHE 376. The correct title should be CHM 376.
6. In the sixth semester, the total Elective credits needed change from 9 to 8 hours. This is due to the modification made in the computer requirement in Freshman Engineering changing from a total of 3 credit hours of computer course work to 4 credits. Chemical Engineering has modified the free elective requirement from 3 credits to 2 in order to maintain the total credit hours required for graduation at 131 hours. This is also reflected in the Footnotes of the Engineering Bulletin (see Section III of this document for details).
7. The computer language requirements have been modified in the Footnotes section of the Engineering Bulletin to reflect the School's current

preference for incoming students to have completed C programming; however FORTRAN will be accepted also (see Section III of this document).

8. Prerequisites and semester offerings have been modified to reflect current practices. The reasons are outlined in Section IV of this document.

## II. CHANGES IN CURRICULUM

The proposed curriculum is to be effective for students entering as freshmen in the Schools of Engineering in the Fall of 1996, and thereafter. The total credit hours required for graduation remains unchanged at 131 credit hours.

### Freshman Year

#### Present

##### Chemistry Sequence.

The freshman chemistry requirement for chemical engineering students is eight credits of general chemical and qualitative analysis. These may be earned by taking one of the following sequences: CHM 115, 116 (eight credits), or CHM 135, 136 (eight credits).

Placement in these sequences is made on the basis of ability demonstrated in freshman orientation tests. Students who receive high scores on the orientation tests are urged to take CHM 135 and 136 in the freshman year. The curriculum is based upon the CHM 115, 116 sequence.

The freshman engineering student who is interested in chemical engineering must fulfill all of the first year requirements of the Department of Freshman Engineering before he or she can enter the School of Chemical Engineering.

#### Proposed

##### Chemistry Sequence.

The freshman chemistry requirement for chemical engineering students is eight credits of general chemical and qualitative analysis. These may be earned by taking one of the following sequences: CHM 123, 124 (eight credits) or CHM 115, 116 (eight credits).

Placement in these sequences is made on the basis of ability demonstrated in freshman orientation tests. Students who receive high scores on the orientation tests are urged to take CHM 123 and 124 in the freshman year. The freshman engineering student who is interested in chemical engineering must fulfill all of the first year requirements of the Department of Freshman Engineering before he or she can enter the School of Chemical Engineering.

### Sophomore Year

#### Third Semester

Present	Proposed
(0) CHE 200 (Chemical Engineering Seminar)	(0) CHE 200 (Chemical Engineering Seminar)
(3) CHE 205 (Chemical Engineering Calculations)*	(3) CHE 205 (Chemical Engineering Calculations)*
(3) CHM 261 (Organic Chemistry)	(1) CHM 263 (Organic Chemistry Laboratory)

- (3) CHM 261 (Organic Chemistry)
- (4) MA 261 (Multivariate Calculus)
- (3) PHYS 241 (Electricity and Optics)
- (3) Elective=
- (17)

- (1) CHM 263 (Organic Chemistry Laboratory)
- (4) MA 261 (Multivariate Calculus)
- (3) MA 265 (Linear Algebra)
- (3) Elective=
- (17)

Fourth Semester

- Present
- (3) CHE 211 (Introductory Chemical Engineering Thermodynamics)
  - (3) CHM 262 (Organic Chemistry)
  - (3) CHE 320 (Statistical Modeling)
  - (3) CHM 262 (Organic Chemistry)
  - (3) IE 343 (Engineering Cost Analysis)
  - (3) Elective=
  - (17)

- Proposed
- (3) CHE 211 (Introductory Chemical Engineering Thermodynamics)
  - (1) CHM 264 (Organic Chemistry Laboratory)
  - (4) MA 262 (Multivariate Calculus)
  - (1) CHM 264 (Organic Chemistry Laboratory)
  - (3) PHYS 241 (Electricity & Optics)
  - (3) MA 266 (Differential Equations)
  - (16)

Junior Year

Fifth Semester

- Present
- (3) CHE 306 (Design of Staged Separation Processes)
  - (3) CHE 377 (Momentum Transfer)
  - (3) CHM 370 (Physical Chemistry)
  - (2) CHE 376 (Physical Chemistry Laboratory)
  - (6) Electives=
  - (17)

- Proposed
- (3) CHE 306 (Design of Staged Separation Processes)
  - (3) CHE 377 (Momentum Transfer)
  - (3) CHM 370 (Physical Chemistry)
  - (2) CHM 376 (Physical Chemistry Laboratory)
  - (6) Electives=
  - (17)

Sixth Semester

- Present
- (0) CHE 300 (Chemical Engineering Seminar)
  - (3) CHE 320 (Statistical Modeling and Quality Enhancement)
  - (3) CHE 348 (Chemical Reaction Engineering)
  - (3) CHE 378 (Heat and Mass Transfer)
  - (9) Electives=
  - (18)

- Proposed
- (0) CHE 300 (Chemical Engineering Seminar)
  - 3) CHE 348 (Chemical Reaction Engineering)
  - (3) CHE 378 (Heat and Mass Transfer)
  - (3) IE 343 (Engineering Cost Analysis)
  - (8) Electives=
  - (17)

Senior Year

Seventh and Eighth Semesters - no changes necessary

### III. CHANGES IN FOOTNOTES

#### Present

\*Knowledge of elementary C programming is required for CHE 205 (or permission of instructors).

= The 36 credit hours of elective courses are to be selected by the student in consultation with his or her faculty adviser to best fulfill the objectives of the individual student's program (see options on page 37). Broadly speaking, the elective program consists of 3 credit hours of technical electives, 12 credit hours of engineering electives, 18 credit hours of general education electives, and 3 credit hours of unrestricted electives. The specifics of this program are outlined on graphical planning sheets provided by the undergraduate office to all students entering the school.

#### Proposed

\*Knowledge of elementary C programming is preferred for CHE 205; however, FORTRAN is acceptable.

= The 35 credit hours of elective courses are to be selected by the student in consultation with his or her academic advisor to best fulfill the objectives of the individual student's program (see options on page 37). Broadly speaking, the elective program consists of 3 credit hours of technical electives, 12 credit hours of engineering electives, 18 credit hours of general education electives, and 2 credit hours of unrestricted electives. The specifics of this program are provided by the undergraduate office and made available to all students in the school.

### IV. CHANGES IN PREREQUISITES AND SEMESTER OFFERED

1. From:  
205 Chemical Engineering Calculations Sem. 1 and 2, Class 3, cr. 3 (3 CHE).  
Prerequisite: CHM 116 or 136; MA 161 or equivalent; PHYS 152 or equivalent.

To:  
205 Chemical Engineering Calculations Sem. 1 and 2, Class 3, cr. 3 (3 CHE).  
Prerequisite: CHM 124 or 116; MA 165, 161 or equivalent; PHYS 152 or equivalent.

Reason:  
Added CHM 124 and removed CHM 136 as prerequisites. CHM 123/124 sequence is now a preference of the School of Chemical Engineering as described in Section I.1. of this document. Changed MA 161 to MA 165 as MA 165/166 is the preferred math sequence in Freshman Engineering for students seeking admission to Chemical Engineering.

2. From:  
320 Statistical Modeling and Quality Enhancement Sem 2. Class 3, cr. 3 (4 CHE).  
Prerequisite: CHE 205 and MA 262.

To:

320 Statistical Modeling and Quality Enhancement Sem 2. Class 3, cr. 3 (4 CHE).

Prerequisite: CHE 205. Pre- or Co-requisite: MA 265.

Reason:

MA 262 has been replaced with the MA 265/266 sequence in the Chemical Engineering curriculum. MA 265, Linear Algebra, is the course required as a co-requisite with CHE 320.

3. From:

348 Chemical Reaction Engineering Sem 1 and 2. Class 3, cr. 3 (6 CHE).

Prerequisite: CHE 211 and MA 262. Prerequisite or co-requisite: CHM 370.

To:

348 Chemical Reaction Engineering Sem 1 and 2. Class 3, cr. 3 (6 CHE).

Prerequisite: CHE 211, MA 265 and MA 266. Pre- or Co-requisite: CHM 370.

Reason:

MA 262 has been replaced with the MA 265/266 sequence in the ChE curriculum.

4. From:

377 Momentum Transfer Sem. 1. Class 3, cr. 3 (5 CHE).

Prerequisite: CHE 205 and MA 262.

To:

377 Momentum Transfer Sem. 1 and 2. Class 3, cr. 3 (5 CHE).

Prerequisite: CHE 205 and MA 266.

Reason:

MA 262 has been replaced with the MA 265/266 sequence in the ChE curriculum. Due to the course content in CHE 377, Differential Equations, MA 266, is the necessary prerequisite.

5. From:

434 Chemical Engineering Laboratory I. Sem. 1. Class 1, Lab. 6, cr. 3 (7 CHE).

Prerequisite: CHE 320, 377; COM 114; ENGL 101; Pre- or co-requisite: CHE 378.

To:

434 Chemical Engineering Laboratory I. Sem. 1. Class 1, Lab. 6, cr. 3 (7 CHE).

Prerequisite: CHE 320, 377; CHM 376; COM 114; ENGL 101; Pre- or co-requisite:

CHE 306, 348, and 378.

Reason:

CHM 376 was added as a prerequisite because previous lab experience is necessary prior to taking this course. CHE 306 and 348 were added as pre- or co-requisites to ensure that the coop students take these courses prior to CHE 435.

6. From:  
435 Chemical Engineering Laboratory II. Sem. 2. Class 1, Lab. 6, cr. 3 (8  
CHE).

Prerequisite: CHE 306, 348, and 434.

To:

435 Chemical Engineering Laboratory II. Sem. 2. Class 1, Lab. 6, cr. 3 (8  
CHE).

Prerequisite: CHE 434.

Reason:

All other prerequisites are required for CHE 434.

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