

## Chemical Engineering

### First Year

#### Fall Semester

3	ENC 1101 Composition I
4	<b>MAC 2281 Engineering Calculus I</b>
3	<b>CHM 2045 General Chemistry I</b>
1	<b>CHM 2045L General Chemistry I Lab</b>
R	EGN 3000 Foundations of Engineering
1	EGN 3000 LAB Foundations of Engineering
3	FKL Human/Diversity & Global Elective
<u>3</u>	FKL Fine Arts Elective
18	<i>Total Credits</i>

#### Spring Semester

3	ENC 1102 Composition II
4	<b>MAC 2282 Engineering Calculus II</b>
3	<b>CHM 2046 General Chemistry II</b>
1	<b>CHM 2046L General Chemistry II Lab</b>
3	<b>PHY 2048 General Physics I</b>
<u>1</u>	<b>PHY 2048L General Physics I Lab</b>
15	<i>Total Credits</i>

### Second Year

#### Fall Semester

4	<b>MAC 2283 Engineering Calculus III</b>
3	<b>PHY 2049 General Physics II</b>
1	<b>PHY 2049L General Physics II Lab</b>
3	EGN 3443 Probability & Statistics for Engineers
3	FKL Humanities Elective
<u>3</u>	FKL Social & Behavioral Science Elective
17	<i>Total Credits</i>

#### Spring Semester

3	EGN 3433 Modeling & Analysis of Engineering Systems or MAP 2302 Differential Equations
3	EGN 3343 Thermodynamics
4	ECH 3023C Material & Energy Balances
<u>3</u>	FKL Humanities Elective
13	<i>Total Credits</i>

#### Summer School

3	CHM 2210 Org Chem
2	CHM 2210L Org Chm Lab
3	FKL Social & Behavioral Science Elective
<u>3</u>	ENC3246 (WI) Communication for Engrs
11	<i>Total Credits</i>

### Third Year

#### Fall Semester

3	ECH 4123 Thermodynamics
4	ECH 4264 Transport Phenomena
4	ECH 4845 Numerical Methods
<u>3</u>	Department Upper Level Elective
14	<i>Total Credits</i>

#### Spring Semester

3	ECH 3702 Instrument Systems
4	ECH 4265C Mass Transfer Operations
3	CHM 2211 Organic Chemistry II
2	CHM 2211L Organic Chemistry II Lab
<u>3</u>	BME 4406 Engineering of Biol. Systems
15	<i>Total Credits</i>

#### Internship/Co-op

List Company/employer  
name and position

### Fourth Year

#### Fall Semester

4	ECH 4415C Reaction Engineering
3	ECH 3240L Chemical Engineering Lab I
3	EMA 4003 Intro to Materials Science
3	ECH 4605 Product & Process Systems
<u>3</u>	Department Upper Level Elective
16	<i>Total Credits</i>

#### Spring Semester

3	ECH 4241L Chemical Engineering Lab II
3	ECH 4323C Process Dynamics and Control
3	ECH 4615 Product and Process Design (CD)
<u>3</u>	Department Upper Level Elective
12	<i>Total Credits</i>

**Note:**

Courses in bold must be completed with an overall grade point average of 2.00.

R – Required course

## Entrance Requirements into the Department of Chemical & Biomedical Engineering

- Completion of the following courses with a minimum grade of C in each course.
  - \_\_\_ Calculus I or Engineering Calculus I (MAC2311 or MAC2281)
  - \_\_\_ General Chemistry I (CHM2045&2045L)
  - \_\_\_ Calculus II or Engineering Calculus II (MAC2312 or MAC2282)
  - \_\_\_ Physics I (PHY2048, 2048L)
  - \_\_\_ Calculus III or Engineering Calculus III (MAC2313 or MAC 2283)
  - \_\_\_ Physics II (PHY2049, PHY2049L)
- Need a USF GPA and an Overall GPA of 2.00 or better

### Continuation Requirements:

- C- is the minimum acceptable grade in an engineering course that is a prerequisite for a subsequent course.
- C- is the minimum acceptable grade in FKL courses
- In other engineering courses, any passing grade may be applied but a minimum 2.0 GPA in the following categories must be maintained at all times: Overall, USF, Math/Science, Engineering and Specialization.
- All math, science and engineering courses must be successfully completed in no more than three registered attempts. Grades of W, I, IF, U, R, and M are considered attempts. Registration that is canceled for non-payment is also considered an attempt.

**Gordon Rule** (6A) is fully met through the mathematics courses above, ENC1101, ENC1102, ENC 3246 and by selecting one technical or general education elective that is an approved 6A communication course. Gordon Rule communication requirement is met for any student entering USF with 60 or more hours.

**Exit Requirements:** Exit requirements must be taken at USF. The Capstone Design Requirement (CD) and Writing Intensive (WI) exit requirements are met through ENC3246 and ECH 4615.

**Course sequence:** Courses in bold should be taken in sequence as early as possible in preparation for your major. Foundation of Knowledge & Learning (FKL) courses may be taken in any order.

### Biomedical Engineering Minor

This biomedical engineering minor is a 15 credit hour program that is open to all engineering majors and other students that meet the prerequisites listed below. For engineering majors, at least 9 hours beyond the B.S. in any Engineering discipline must be completed for the biomedical engineering minor. Student must register with the Department of Chemical & Biomedical Engineering undergraduate advisor prior to starting this minor program. Departments within the College of Engineering are currently developing additional courses that will be added to the list of courses that can be applied to this minor, so consultation with the advisor will insure that students are informed of all offered courses.

#### Prerequisite courses:

1. Biology I: BSC 2010
2. Calculus II: MAC 2282, MAC 2242, MAC 2233 or MAC 2312
3. Physics II: PHY 2049 or PHY 2054
4. General Chemistry II: CHM 2046

#### Required Courses (6 hours)

ECH 4931 Special Topics in Chemical Engineering*	3
BME 4406 Engineering of Biological Systems	3

#### The remaining 9 credit hours can be taken from the following list:

ECH 6417 Bioseparations	3
ECH 4931 Special Topics in Chemical Engineering**	3
PHZ 4702 Applications of Physics to Biology & Medicine I	4
PHZ 4703 Applications of Physics to Biology & Medicine II	4
BCH 3023 Introductory Biochemistry	3
EIN 4313C Human Factors	3
BME 5006 Theory and Design of Bioprocesses	3
EIN 5245 Work Physiology/Biomechanics	3
BME 5040 Pharmaceutical Engineering	2
ECH 5748 Selected Topics in Biomedical Engineering**	1-10
BME 5748 Selected Topics in Biomedical Engineering **	3

\*Please see academic advisor for required special topics courses.

\*\*Please see academic advisor for selected special topics courses.