

# CHEMICAL ENGINEERING (FIEP) - CLASS OF 2021

## Freshman Year Fall Semester

| Course Code | Description                                      | Cr        |  |
|-------------|--|-----------|--|
| CHM 101     | General Chemistry Lec I (A1)                     | 3         |  |
| CHM 102     | General Chemistry I Lab                          | 1         |  |
| EGR 105     | Foundations of Engineering I (A4)                | 1         |  |
| MTH 141     | Intro Calculus with Analytical Geometry (A1, B3) | 4         |  |
| PHY 203     | Elementary Physics I (A1)                        | 3         |  |
| PHY 273     | Elementary Physics Lab I (A1)                    | 1         |  |
| FRN XXX     |  | 3         |  |
|             |  | <b>16</b> |  |

## Freshman Year Spring Semester

| Course Code | Description                           | Cr        |  |
|-------------|---------------------------------------|-----------|--|
| CHM 112     | General Chemistry II Lec              | 3         |  |
| CHM 114     | General Chemistry II Lab              | 1         |  |
| EGR 106     | Foundations of Engineering II (A4)    | 2         |  |
| MTH 142     | Intermed Calc with Analytic Geom (B3) | 4         |  |
| PHY 204     | Elementary Physics II (A1)            | 3         |  |
| PHY 274     | Elementary Physics Lab II (A1)        | 1         |  |
| FRN XXX     |                                       | 3         |  |
|             |                                       | <b>17</b> |  |

## Sophomore Year Fall Semester

| Course Code | Description                                | Cr        |  |
|-------------|--|-----------|--|
| CHE 212     | Chemical Process Calculations              | 3         |  |
| CHM227      | Organic Chemistry Lec I                    | 3         |  |
| ECN 201     | Principles of Microeconomics (A2)          | 3         |  |
| MTH 243     | Calculus for Funcs. of Sev. Vars. (A1, B3) | 3         |  |
|             | General Education Outcome(s)*              | 3         |  |
| FRN XXX     |  | 3         |  |
|             |  | <b>18</b> |  |

## Sophomore Year Spring Semester

| Course Code                  | Description   | Cr        |  |
|------------------------------|---|-----------|--|
| CHE 232                      | Materials Science and Engineering                               | 3         |  |
| CHE 272                      | Intro to Chemical Engineering Calculations                      | 3         |  |
| CHE 313                      | Chemical Engineering Thermodynamics I                           | 3         |  |
| CHM 228 <i>or</i><br>CMB 311 | Organic Chemistry Lec II <i>or</i><br>Introductory Biochemistry | 3         |  |
| MTH 244                      | Differential Equations  | 3         |  |
| FRN XXX                      |   | 3         |  |
|                              |   | <b>18</b> |  |

## Junior Year Fall Semester

| Course Code | Description                            | Cr        |  |
|-------------|--|-----------|--|
| CHE 314     | Chemical Engineering Thermodynamics II | 3         |  |
| CHE 347     | Transfer Operations I                  | 3         |  |
| CHM 335     | Physical Chemistry Lab                 | 2         |  |
| CHM 431     | Physical Chemistry I                   | 3         |  |
|             | Approved Mathematics Elective**        | 3         |  |
| FRN XXX     |  | 3         |  |
|             |  | <b>17</b> |  |

## Junior Year Spring Semester

| Course Code | Description                          | Cr        |  |
|-------------|--------------------------------------|-----------|--|
| CHE 348     | Transfer Operations II               | 3         |  |
| CHE 364     | Chemical Kinetics and Reactor Design | 3         |  |
| CHM 432     | Physical Chemistry II***             | 3         |  |
|             | General Education Outcome(s)*        | 3         |  |
|             | General Education Outcome(s)*        | 3         |  |
| FRN XXX     |                                      | 3         |  |
|             |                                      | <b>18</b> |  |

## Semester Abroad

| Course Code | Description                           | Cr        |  |
|-------------|---------------------------------------|-----------|--|
|             | Engineering Professional Elective**** | 3         |  |
|             | General Education Outcome(s)*         | 3         |  |
|             | General Education Outcome(s)*         | 3         |  |
|             | General Education Outcome(s)*         | 3         |  |
| FRN 3XX/4XX |                                       | 3         |  |
|             |                                       | <b>15</b> |  |

## International Internship Semester

| Course Code | Description           | Cr         |  |
|-------------|-----------------------|------------|--|
| FRN 315-316 | Language Study Abroad | 3-6        |  |
|             |                       |            |  |
|             |                       |            |  |
|             |                       |            |  |
|             |                       |            |  |
|             |                       | <b>3-6</b> |  |

## Senior Year Fall Semester

| Course Code | Description                        | Cr |  |
|-------------|------------------------------------|----|--|
| CHE 345     | Chemical Engineering Lab I         | 2  |  |
| CHE 425     | Process Dynamics and Control       | 3  |  |
| CHE 428     | Professional Experience            | 1  |  |
| CHE 449     | Transfer Operations III            | 3  |  |
| CHE 451     | Plant Design and Economics I       | 3  |  |
|             | Approved Professional Elective**** | 3  |  |
| FRN 4XX     |                                    | 3  |  |

## Senior Year Spring Semester

| Course Code | Description                            | Cr |  |
|-------------|--|----|--|
| CHE 346     | Chemical Engineering Lab II            | 2  |  |
| CHE 452     | Plant Design and Economics II (D1, C2) | 3  |  |
|             | Approved Professional Elective****     | 3  |  |
|             | Approved Professional Elective****     | 3  |  |
|             | General Education Outcome(s)           | 3  |  |
| FRN 4XX     |  | 3  |  |

**Specified Math, Science, and Engineering Courses**

| Introductory Engineering |              |    |       |    |      |
|--------------------------|--------------|----|-------|----|------|
| Sem                      | Course       | Cr | Grade | QP | Note |
|                          | EGR 105 (A4) | 1  |       |    |      |
|                          | EGR 106 (A4) | 2  |       |    |      |
|                          |              | 3  |       |    |      |

| Mathematics |                   |    |       |    |      |
|-------------|-------------------|----|-------|----|------|
| Sem         | Course            | Cr | Grade | QP | Note |
|             | MTH 141 (A1 & B3) | 4  |       |    |      |
|             | MTH 142 (B3)      | 4  |       |    |      |
|             | MTH 243 (A1 & B3) | 3  |       |    |      |
|             | MTH 244           | 3  |       |    |      |
|             |                   | 14 |       |    |      |

| Natural Sciences |                    |    |       |    |      |
|------------------|--------------------|----|-------|----|------|
| Sem              | Course             | Cr | Grade | QP | Note |
|                  | CHM 101 (A1)       | 3  |       |    |      |
|                  | CHM 102            | 1  |       |    |      |
|                  | CHM 112            | 3  |       |    |      |
|                  | CHM 114            | 1  |       |    |      |
|                  | CHM 227            | 3  |       |    |      |
|                  | CHM 228 or CMB 311 | 3  |       |    |      |
|                  | CHM 335            | 2  |       |    |      |
|                  | CHM 431            | 3  |       |    |      |
|                  | CHM 432***         | 3  |       |    |      |
|                  | PHY 203 (A1)       | 3  |       |    |      |
|                  | PHY 273 (A1)       | 1  |       |    |      |
|                  | PHY 204 (A1)       | 3  |       |    |      |
|                  | PHY 274 (A1)       | 1  |       |    |      |
|                  |                    | 30 |       |    |      |

| Engineering Science and Design (Major) |                                    |    |       |    |      |
|--|------------------------------------|----|-------|----|------|
| Sem                                    | Course                             | Cr | Grade | QP | Note |
|  | CHE 212                            | 3  |       |    |      |
|  | CHE 232                            | 3  |       |    |      |
|  | CHE 272                            | 3  |       |    |      |
|  | CHE 313                            | 3  |       |    |      |
|  | CHE 314                            | 3  |       |    |      |
|  | CHE 345 [capstone]                 | 2  |       |    |      |
|  | CHE 346 [capstone]                 | 2  |       |    |      |
|  | CHE 347                            | 3  |       |    |      |
|  | CHE 348                            | 3  |       |    |      |
|  | CHE 364 (464)                      | 3  |       |    |      |
|  | CHE 425                            | 3  |       |    |      |
|  | CHE 428 (328)                      | 1  |       |    |      |
|  | CHE 449 (349)                      | 3  |       |    |      |
|  | CHE 451 (351) [capstone]           | 3  |       |    |      |
|  | CHE 452 (352) [capstone] (D1 & C2) | 3  |       |    |      |
|  |                                    | 41 |       |    |      |

| ****Professional Elective |        |    |       |    |      |
|---------------------------|--------|----|-------|----|------|
| Sem                       | Course | Cr | Grade | QP | Note |
|                           |        | 3  |       |    |      |
|                           |        | 3  |       |    |      |
|                           |        | 3  |       |    |      |
|                           |        | 3  |       |    |      |
|                           |        | 12 |       |    |      |

| **Mathematics Elective |        |    |       |    |      |
|------------------------|--------|----|-------|----|------|
| Sem                    | Course | Cr | Grade | QP | Note |
|                        |        | 3  |       |    |      |

\* **General Education Outcomes:** at least 40 credits must be completed. (A1-D1) must be met by at least three credits. A single course may satisfy one or two outcomes, and at least one course must be a "Grand Challenge". No more than twelve credits can be from the same course code except HPR. General education courses may also be used to meet requirements of your major(s) or minor(s) when appropriate.

\*\***Mathematics Elective:** MTH 215 or any 300-, 400-, or 500- level MTH course except 381

\*\*\*Or approved **Professional Elective** (see \*\*\*\* below)

| French Language Requirements |                      |    |    |    |
|------------------------------|----------------------|----|----|----|
| Sem                          | Course               | Cr | Gr | QP |
|                              | FRN ____             | 3  |    |    |
|                              | FRN ____             | 3  |    |    |
|                              | FRN ____             | 3  |    |    |
|                              | FRN ____             | 3  |    |    |
|                              | FRN ____             | 3  |    |    |
|                              | FRN ____             | 3  |    |    |
|                              | FRN ____             | 3  |    |    |
|                              | FRN 412, 473, or 474 | 3  |    |    |
|                              | FRN 4 ____           | 3  |    |    |

FRN 101, 102, 391, 392, 393 will not count toward the major.

| General Education Outcome Audit  |                         |        |
|--|-------------------------|--------|
|  | Course                  | Credit |
| <b>Knowledge</b>   |                         |        |
| A1. STEM   | CHM & PHY (see above)   | 11     |
| A2. Social & Behavioral Sciences   | ECN 201                 | 3      |
| A3. Humanities   | FRN 1XX/2XX (suggested) | 3      |
| A4. Arts & Design  | EGR 105 & 106           | 3      |
| <b>Competences</b>   |                         |        |
| B1. Write Effectively  |                         |        |
| B2. Communicate Effectively or computational strategies                        | MTH (see above)         | 11     |
| B4. Information literacy   |                         |        |
| <b>Responsibilities</b>  |                         |        |
| C1. Civic knowledge & responsibility   |                         |        |
| C2. Global responsibilities  | FRN 1XX/2XX (suggested) | 3      |
| C3. Diversity and Inclusion  |                         |        |
| <b>Inegrate &amp; Apply</b>  |                         |        |
| D1. Ability to synthesize  | CHE 452                 | 3      |
| <b>Grand Challenge</b>   |                         |        |
| G. Check that at least one course of your 40 credits is an approved "G" course |                         |        |
| Total General Education Outcome Credits  |                         | 40     |