



This course plan is a recommended sequence for this major. Courses designated as critical (!) may have a deadline for completion and/or affect time to graduation. Please see the Program Notes section for details regarding "critical courses" for this particular Program of Study.

| !                                       | Course Subject and Title   | Credit Hours | Min. Grade <sup>1</sup> | Program GPA <sup>2</sup> | Code             | Prerequisites   | Notes |
|---|--|--------------|-------------------------|--------------------------|------------------|---|-------|
| <b>Semester One (16 Credit Hours)</b>   |  |              |                         |                          |                  |   |       |
| !                                       | ENGL 101 Critical Reading and Composition  | 3            | C                       |                          | CC-CMW           |   |       |
| !                                       | MATH 141 Calculus 1 <sup>3</sup>   | 4            | C                       |                          | CC-ARP           | C or better in MATH 112/115/116 <i>or</i> Math placement test score                     |       |
| !                                       | CHEM 111 & CHEM 111L – General Chemistry I   | 4            | C                       |                          | CC-SCI           | C or better in MATH 111/115/122/141 <i>or</i> higher math <i>or</i> Math placement test |       |
| !                                       | ECHE 101 Intro. to Chemical Engineering  | 2            |                         | *                        | PR               |   |       |
|   | Carolina Core AIU <sup>4</sup> & <sup>5</sup>  | 3            |                         |                          | CC-AIU           |   |       |
| <b>Semester Two (18 Credit Hours)</b>   |  |              |                         |                          |                  |   |       |
| !                                       | ENGL 102 Rhetoric and Composition  | 3            |                         |                          | CC-CMW<br>CC-INF | C or better in ENGL 101   |       |
| !                                       | MATH 142 Calculus II   | 4            | C                       |                          | CC-ARP           | C or better in MATH 141   |       |
| !                                       | CHEM 112 & CHEM 112L – General Chemistry II  | 4            | C                       |                          | PR               | C or better in CHEM 111 or 141 & MATH 111/115/122/141 <i>or</i> higher math             |       |
| !                                       | PHYS 211 & PHYS 211L – Essentials of Physics I   | 4            | C                       |                          | CC-SCI           | C or better in MATH 141   |       |
| !                                       | ECHE 300 Chemical Process Principles   | 3            | C                       | *                        | PR               | D or better in MATH 141; Prereq or Coreq: D or better in CHEM 112 <i>or</i> 142         |       |
| <b>Semester Three (18 Credit Hours)</b> |  |              |                         |                          |                  |   |       |
|   | Professional Development Elective <sup>6</sup>   | 1            |                         | *                        | PR               |   |       |
| !                                       | ECHE 310 Intro. to Chem. Engr. Thermodynamics  | 3            |                         | *                        | PR               | C or better in ECHE 300; Prereq or Coreq: MATH 241                                      |       |
| !                                       | MATH 241 Vector Calculus   | 3            |                         |                          | PR               | C or better in MATH 142   |       |
| !                                       | CHEM 333 Organic Chemistry I   | 3            | C                       |                          | PR               | C or better in CHEM 112 <i>or</i> CHEM 142  |       |
|   | Chemistry Lab Elective <sup>7</sup>  | 1            |                         |                          | PR               | See Bulletin listing.   |       |
| !                                       | PHYS 212 & PHYS 212L – Essentials of Physics II  | 4            |                         |                          | PR               | C or better PHYS 211 <i>and</i> MATH 142  |       |
|   | Carolina Core GSS <sup>4</sup> & <sup>5</sup>  | 3            |                         |                          | CC-GSS           |   |       |
| <b>Semester Four (16 Credit Hours)</b>  |  |              |                         |                          |                  |   |       |
| !                                       | ECHE 311 Chem. Engr. Thermodynamics  | 3            |                         | *                        | PR               | ECHE 310 <i>or</i> ENCP 290   |       |
| !                                       | ECHE 320 Chem. Engr. Fluid Mechanics   | 3            |                         | *                        | PR               | PHYS 211; Prereq or Coreq: MATH 241   |       |
| !                                       | MATH 242 Elem. Differential Equations  | 3            | C                       |                          | PR               | C or better in MATH 142   |       |
| !                                       | CHEM 334 Organic Chemistry II  | 3            |                         |                          | PR               | C or better in CHEM 333   |       |
|   | Chemistry Lab Elective <sup>7</sup>  | 1            |                         |                          | PR               | See Bulletin listing.   |       |
|   | Carolina Core GHS <sup>4</sup> & <sup>5</sup>  | 3            |                         |                          | CC-GHS           |   |       |
| <b>Semester Five (18 Credit Hours)</b>  |  |              |                         |                          |                  |   |       |
| !                                       | ECHE 321 Heat-Flow Analysis  | 3            |                         | *                        | MR               | ECHE 320 <i>or</i> ENCP 360 & C or better in MATH 242                                   |       |
| !                                       | ECHE 440 Separation Process Design   | 3            |                         | *                        | MR               | C or better in ECHE 300; Prereq or Coreq: ECHE 311                                      |       |
| !                                       | ECHE 550 Chem.-Proc. Dynamics & Control  | 3            |                         | *                        | MR               | C or better in ECHE 300 & MATH 242  |       |
|   | Technical Elective <sup>8</sup>  | 3            |                         |                          | PR               | See Bulletin listing.   |       |
|   | Chemistry Elective <sup>9</sup>  | 3            |                         |                          | PR               | See Bulletin listing.   |       |
|   | Carolina Core CMS <sup>4</sup> & <sup>5</sup>  | 3            |                         |                          | CC-CMS           |   |       |
| <b>Semester Six (15 Credit Hours)</b>   |  |              |                         |                          |                  |   |       |
| !                                       | ECHE 322 Mass Transfer   | 3            |                         | *                        | MR               | ECHE 320 <i>or</i> ENCP 360   |       |
| !                                       | ECHE 460 Chemical Engineering Lab 1  | 3            |                         | *                        | MR               | Prereq or Coreq: ECHE 311 & ECHE 321  |       |
|   | Engineering Elective <sup>10</sup>   | 3            |                         | *                        | PR               | See Bulletin listing.   |       |
|   | Technical Elective <sup>8</sup>  | 3            |                         |                          | PR               | See Bulletin listing.   |       |
|   | Carolina Core VSR <sup>4</sup> ( <i>if needed</i> ) <i>or</i> Liberal Arts Elective <sup>5</sup> | 3            |                         |                          | CC-VSR/<br>PR    |   |       |
| <b>Semester Seven (15 Credit Hours)</b> |  |              |                         |                          |                  |   |       |
| !                                       | ECHE 430 Chemical Engineering Kinetics   | 3            |                         | *                        | MR               | ECHE 311; Prereq or Coreq: ECHE 321   |       |
| !                                       | ECHE 461 Chemical Engineering Lab II   | 3            |                         | *                        | MR               | ECHE 460; Prereq or Coreq: ECHE 430 & 440   |       |
| !                                       | ECHE 465 Chemical Process Analysis & Design I  | 3            |                         | *                        | MR               | Prereq or Coreq: ECHE 430 & 440   |       |
|   | Chemistry Elective <sup>9</sup>  | 3            |                         |                          | PR               | See Bulletin listing.   |       |
|   | Liberal Arts Elective <sup>5</sup>   | 3            |                         |                          | PR               |   |       |

| Semester Eight (15 Credit Hours)               |     |  |   |              |  |  |
|--|-----|--|---|--------------|--|--|
| ECHE 466 Chemical Process Analysis & Design II | 3   |  | * | MR<br>CC-INT | ECHE 430, 440, 465; Prereq or Coreq:<br>ECHE 322, 550, 567 |  |
| ECHE 567 Process Safety, Health & Loss Prev.   | 3   |  | * | MR           | Prereq or Coreq: ECHE 466                                  |  |
| Engineering Elective <sup>10</sup>             | 3   |  | * | PR           | See Bulletin listing.                                      |  |
| Technical Elective <sup>8</sup>                | 3   |  |   | PR           | See Bulletin listing.                                      |  |
| Technical Elective <sup>8</sup>                | 3   |  |   | PR           | See Bulletin listing.                                      |  |
| Take during any semester (0-6 Credit Hours)    |     |  |   |              |  |  |
| Carolina Core GFL <sup>4</sup>                 | 0-6 |  |   | CC-GFL       |  |  |

### Graduation Requirements Summary

| Minimum Total Hours | Minimum Major Requirements Hours | College & Program Requirements Hours | Carolina Core Hours | Minimum Institutional GPA |
|---------------------|----------------------------------|--------------------------------------|---------------------|---------------------------|
| 131                 | 30                               | 64-67                                | 34-46               | 2.00                      |

- Regardless of individual course grades, students must maintain a minimum 2.00 cumulative GPA.
- Some colleges require a minimum GPA for major courses. Courses indicated in this column are included in the Chemical Engr. program GPA of 2.00.
- Students who place into MATH 115 will be required to successfully complete it before taking MATH 141.
- The [Carolina Core](#) provides the common core of knowledge, skill and academic experience for all Carolina undergraduate students. Students in the College of Engineering and Computing are required to demonstrate proficiency in one foreign language equivalent to the 121 course by 1) a score of two or better on the foreign language placement test; or 2) completion of the 109 and 110 courses in FREN, GERM, LATN, or SPAN or completion of the 121 course in another foreign language. Students who do not place out of the GFL requirement may need to take additional hours to meet this requirement.
- A total of 6 courses (18 hours) of Carolina Core/Liberal Arts Electives are required. These must include courses that satisfy Carolina Core requirements for AIU, CMS, GHS, GSS, and VSR. If an overlay course is used to satisfy two components of the Carolina Core, then two Liberal Arts Electives are needed in addition to those courses fulfilling the Carolina Core requirements. If five stand-alone courses are used to satisfy the five Carolina Core requirements (AIU, CMS, GHS, GSS, and VSR), then one additional Liberal Arts Elective is needed. At least one of the six courses used to satisfy a Carolina Core/Liberal Arts Elective requirement must be at the 300-level or above *and* in the same field of study as one of the other five courses. A list of acceptable Liberal Arts Elective courses is maintained in the department office and the **Bulletin**. The list includes all Carolina Core Liberal Arts courses (AIU, CMS, GFL, GHS, GSS, and VSR), and other department approved courses.
- A list of acceptable Professional Development Elective courses is maintained in the department office and on the Bulletin. The list includes: ECHE 202 & BMEN 202.
- Chemistry Lab Electives (2 hours):** CHEM 321L (or 322L), 331L (or 333L), 332L (or 334L), 541L, 542L, 550L, 591L, 592L, 621L.
- Technical Electives (12 hours):** Includes all courses listed as Engineering Electives, Chemistry Electives, & Chemistry Lab Electives as well as **ENCP** 102 (or EMCH 111), **MATH** 374, MATH 500 and above; **STAT** 500 and above except 541 and 591; **BIOL** 101, 101L, 102, 102L, 120, 120L, 200 and above; **GEOL** any course; **MSCI** any course; **PHYS** 300 and above; **CSCE** 145, 146, 206, 210, 215, 350.
- Chemistry Electives (6 hours):** CHEM 321, 322, 511, 533, 541, 542, 545, 550, 555, 556, 621, 622, 623, 624, 633, 644.
- Engineering Electives (6 hours):** ENCP 200 (or ECIV 200 or EMCH 200), ENCP 201 (or EMCH 201), ENCP 210 (or ECIV 210 or EMCH 310), ENCP 260 (or ECIV 220 or EMCH 260), ENCP 330 (or EMCH 330), ENCP 460, ENCP 481, ENCP 499, ENCP 540; **BMEN** 211, 260, 271, 290, 300 and above, except 301 and 303; **CSCE** 211, 212, 240, 313, 317, 274; **ECHE** 372, 389, 456, 497, 499, 520, 571, 572, 573, 574, 589; **ECIV** 300 and above, except 360; **ELCT** 220, 221, 222, 300 and above; **EMCH** 300 and above, except 354 and 360.

### Program Notes:

- Courses identified as “critical” must be completed by the semester in which they are listed in order to ensure a timely graduation due to prerequisite requirements for subsequent required courses.
- A student cannot repeat courses from the College of Engineering and Computing in which they earned a grade of C or better. In addition, a student cannot repeat any course from the College a second time. No more than four courses from the College of Engineering and Computing may be repeated in order to satisfy the requirements for any degree from the College, regardless of satisfactory work. For this purpose, withdrawal from a course with a grade of **W** is not regarded as enrollment in that course. A student that does not satisfactorily complete a degree-required College course within two attempts must change major or transfer out of the College of Engineering and Computing.
- The B.S.E. with Distinction is available to students majoring in chemical engineering who wish to participate in significant research and/or design activities in chemical engineering with a faculty mentor. More details are available on the Bulletin.
- A concentration in Biomolecular Engineering, Energy, Interdisciplinary Engineering, Materials, Environmental Engineering, or Numerical Methods & Computing is available to students majoring in chemical engineering. More details are available in the Bulletin.
- The last 30 credit hours toward your degree and at least half of the major must be earned in residence at the University of South Carolina-Columbia.
- Disclaimer: Prerequisites on courses are subject to change. Please refer to Bulletin.

**University Requirements:** Bachelor’s degree-seeking students must meet Carolina Core (general education) requirements. For more information regarding these requirements, please visit the [Carolina Core](#) page on the University website.

| Codes: |  |        |   |
|--------|--|--------|---|
| CC     | Carolina Core  | CC-INF | Carolina Core – Information Literacy                      |
| CC-AIU | Carolina Core-Aesthetic and Interpretive Understanding                             | CC-INT | Carolina Core – Integrative Course                        |
| CC-ARP | Carolina Core-Analytical Reasoning and Problem-Solving                             | CC-SCI | Carolina Core – Scientific Literacy                       |
| CC-CMS | Carolina Core-Effective, Engaged, and Persuasive Communication: Spoken Component   | CC-VSR | Carolina Core – Values, Ethics, and Social Responsibility |
| CC-CMW | Effective, Engaged, and Persuasive Communication: Written Component                | CR     | College Requirement                                       |
| CC-GFL | Carolina Core-Global Citizenship and Multicultural Understanding: Foreign Language | MR     | Major Requirement   |
| CC-GHS | Carolina Core – Historical Thinking  | PR     | Program Requirement                                       |
| CC-GSS | Carolina Core – Social Sciences  |        |   |

Disclaimer: Major maps are only a suggested or recommended sequence of courses required in a program of study. Please contact your academic advisor for assistance in the application of specific coursework to a program of study and course selection and planning for upcoming semesters.