CHEMICAL ENGINEERING

2022 – 2023 Curriculum

***Fall Only** ****Spring Only**

Student: _____
Date: _____
CUID: _____
Advisor: _____

FRESHMAN YEAR							
Term Info		**Cr**	**Course**	**Term Info**		**Cr**	**Course**
		4	CH 1010 & 1011 General Chemistry[1]			4	CH 1020 & 1021 General Chemistry
		3	ENGL 1030 & 1031 Composition and Rhetoric[1]			3	CHE 1300 Intro to Chemical Engineering[1]
		3	ENGR 1020 & 1021 Engineering Disciplines and Skills[1,2]			4	MATH 1080 Calculus of One Variable II[1]
		4	MATH 1060 Calculus of One Variable I[1,3]			3	PHYS 1220 Physics with Calculus I[1]
		3	Arts & Humanities *OR* Social Science Req[4]			3	General Education Req[4]
		17				**17**	
SOPHOMORE YEAR							
Term Info		**Cr**	**Course**	**Term Info**		**Cr**	**Course**
		3	CH 2230 Organic Chemistry			3	CH 2240 Organic Chemistry
		4	CHE 2110 & 2111 Mass and Energy Balances*			1	CH 2290 Organic Chemistry Lab.[5]
		4	MATH 2060 Calculus of Several Variables			3	CHE 2200 Chemical Engineering Thermodynamics I**
		3	PHYS 2210 Physics with Calculus II			4	CHE 2300 & 2301 Fluids/Heat Transfer**
		3	General Education Requirement[4]			4	MATH 2080 Int. to Ordinary Differential Eqn.
		17				**15**	
JUNIOR YEAR							
Term Info		**Cr**	**Course**	**Term Info**		**Cr**	**Course**
		1	CH 3390 Physical Chemistry Lab			3	CH 3320 Physical Chemistry**
		3	CHE 3210 Chemical Engineering Thermodynamics II			1	CH 3400 Physical Chemistry Lab**
		4	CHE 3300 & 3301 Mass Transfer and Separation Pro.			3	CHE 3070 & 3071 Unit Operations Lab I
		2	ECE 2070 Basic Electrical Engineering			3	CHE 3190 Engineering Materials**
		1	ECE 2080 Basic Electrical Engineering Lab			3	Emphasis Area Req[6]
		3	STAT 4110 Statistical Methods for Process Dev. & Con.			3	General Education Requirement[4]
		3	BMOL 4250 Biomolecular Engineering*				
		17				**16**	
SENIOR YEAR							
Term Info		**Cr**	**Course**	**Term Info**		**Cr**	**Course**
		3	Emphasis Area Req[6]			3	BMOL 4290 Bioprocess Engineering**
		3	CHE 4070 & 4071 Unit Operations Lab II*			3	CHE 3530 Process Dynamics and Control**
		3	CHE 4310 Chemical Process Design I*			3	CHE 4330 & 4331 Process Design II**
		3	CHE 4430 Safety, Environmental and Prof. Practice I*			1	CHE 4440 Safety, Environmental and Prof. Practice II**
		3	CHE 4500 Chemical Reaction Engineering*			3	Arts & Humanities *OR* Social Science Requirement[4,7]
						3	Emphasis Area Req[6]
		15				**16**	
							130 Total Semester Hours

GENERAL EDUCATION REQUIREMENTS					
Literature	**Non-Literature**	**Social Science** (SC REACH Act, if required)	**Social Science** (from a different department)	**Global Challenges** (ENGR 1020 at Clemson or another course)	**Global Challenges -3000 or 4000 level Or if already met with Tech Requirement, then need Dept Arts & Humanities/Social Sci Req**

CHANGE OF MAJOR REQUIREMENTS: C grade or higher in each class and a 2.0 Clemson cumulative GPA					
CH 1010	**ENGL 1030**	**ENGR 1020**	**CHE 1300**	**MATH 1060**	**PHYS 1220**

Students should always refer to the Academic Catalog for course descriptions and for course pre-requisites, corequisites, and concurrent enrollment requirements. Academic Catalog can be found here: https://www.clemson.edu/registrar/academic-catalogs/. Advisors will assist students in scheduling courses to fulfill the requirements of the degree program; nevertheless, it is the responsibility of the student to fulfill the relevant requirements of the degree.

Footnotes

[1] Must be passed with a grade of *C* or better.

[2] The combination of ENGR 1050 and ENGR 1060 or the combination of ENGR 1510 and ENGR 1520 may be substituted for ENGR 1020.

[3] Depending on a student's Clemson Mathematics Placement Test score, MATH 1040 and MATH 1070 may be substituted for MATH 1060; or the student may be required to take MATH 1050 before enrolling in MATH 1060.

[4] See General Education Requirements. Three General Education credits must also satisfy the South Carolina REACH Act R-equirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

[5] CH 2270 and CH 2280 may be substituted for CH 2290.

[6] Nine credit hours devoted to the completion of an emphasis area or approved minor are required. Emphasis Area courses may not be used to satisfy other degree requirements. Select from the following Emphasis Areas:

- **Applied Engineering, Mathematics and Science Emphasis Area**-Select from the following lists. At least one course must be selected from the Engineering courses list.
    - *Engineering Courses*-CHE 4010, CHE 4140, CE 2010, IE 3600, IE 3610, IE 4620, ME 2040
    - *Mathematics Courses*-MATH 4340 or MATH 4500
    - *Science Courses*-CH 3130, CH 4020, CH 4110, CH 4130, CH 4210, CH 4270, CH 4350, PHYS 2220, PHYS 4200, PHYS 4320, PHYS 4410, PHYS 4450
- **Biomolecular Science and Engineering Emphasis Area**-Select from the following lists. At least one course must be selected from the Engineering courses list and Science courses list.
    - *Engineering Courses*-BE 4280, BIOE 3020, BIOE 4010, BIOE 4020, BIOE 4400, BIOE 4480, BIOE 4490, BMOL 4260, BMOL 4270
    - *Science Courses*-BCHM 3050, BCHM 4060, BCHM 4310, BCHM 4330, BCHM 4360, BIOL 4340, CH 3600, CH 4040, CH 4140, CH 4250, GEN 4400, MICR 3050, MICR 4070, MICR 4130, PHYS 4170
- **Business Management Emphasis Area**-MGT 2010 is required. Select two additional courses from ACCT 2010, ECON 3060, ECON 3100, ECON 3210, ELE 3010, ELE 4010, ELE 4070, MGT 3900, MGT 4110, MGT 4230, MKT 3140
- **Energy Studies Emphasis Area**-Select from AGRB 4570, BE 4400, CE 4370, CE 4400, CE 4430, CE 4910, CHE 4140, CHE 4150, ECE 4200, ECE 4570, ECE 4610, ECE 4710, ECON 4570, EES 3100, EES 4100, EES 4120, GEOL 4090, ME 4200, ME 4220, ME 4260, ME 4570
- **Environmental Engineering and Science Emphasis Area**-Select two engineering courses and one science or policy course from the following lists:
    - *Engineering Courses*-BE 4240, BE 4400, BMOL 4030, CHE 4010, CHE 4140, CHE 4150, EES 4010, EES 4020, EES 4100, EES 4110, EES 4300, EES 4800, EES 4850, EES 4860, ETOX 4210, ETOX 4460
    - *Science/Policy Courses*-CH 4110, CH 4130, ENR 3120, ENSP 4000, PHYS 2450, PHYS 4200
- **Polymeric Materials Emphasis Area**-Select from BIOE 3020, CH 4650, CHE 4120, CHE 4130, CHE 4450, MSE 4150, MSE 4610, PKSC 4160. Students may not use both CHE 4120 and MSE 4150 to satisfy this requirement.

[7] Select a three-credit 3000- or 4000-level course that satisfies the Global Challenges General Education Requirement or select any three-credit course that satisfies the Arts and Humanities or Social Science General Education Requirement. See Policy on Humanities and Social Sciences for Engineering Curricula.

NOTES:

1. No student may exceed a maximum of two attempts, including a *W*, to complete successfully any BMOL or CHE course.
2. In addition to institutional requirements, candidates for a BS degree in Chemical Engineering are required to have a cumulative grade-point average of 2.00 or higher in all engineering courses taken at Clemson. Undergraduate and graduate courses taught in the following rubrics are used in the calculation of a student's engineering GPA (eGPA): AMFG, AUE, BE, BIOE, BMOL, CE, CES, CHE, CME, ECAS, ECE, EES, EG, EM, ENGR, ESED, IE, ME, and MSE. All attempts of these courses with grades of *A, B, C, D, F,* and *I* are included in the calculation. Grades of *CE, CR, FGD, FGF, NP, P, SCD, SCN, SCP, TR,* and *W* are NOT included in the calculation.
3. Depending on a student's math placement, they may be invited to take part in the General Engineering Learning Community where they complete the following courses: ENGR 1000, ENGR 1010, ENGR 1100, ENGR 1110, ENGR 1510, and ENGR 1520. The combination of ENGR 1510 and ENGR 1520 may be substituted for ENGR 1020.
4. A transfer course may not be used to satisfy the General Education Global Challenges Requirement. While a transfer course may fulfill other degree requirements, students must enroll in a Clemson course(s) on the Global Challenges list to fulfill the Global Challenges Requirement.