

COLLEGE OF ENGINEERING
DEPARTMENT OF CHEMICAL ENGINEERING
BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING (BSCHE)
FOR STUDENTS GRADUATING IN CALENDAR YEAR 2021
131 CREDITS REQUIRED FOR GRADUATION

APPROVED
University Registrar

FALL SEMESTER FRESHMAN 2017		Credits	SPRING SEMESTER FRESHMAN 2018		Credits
CHEM 1035 General Chemistry		3	CHEM 1036 General Chemistry Pre: CHEM 1035		3
CHEM 1045 General Chemistry Lab Co: CHEM 1035		1	CHEM 1046 General Chemistry Lab Pre: CHEM 1045 Co: CHEM 1036		1
ENGL 1105 First-Year Writing		3	ENGL 1106 First-Year Writing Pre: ENGL 1105		3
MATH 1225 Calculus of Single Variable (C-) Pre: Math Ready		4	MATH 1226 Calculus of Single Variable (C-) Pre: MATH 1225		4
ENGE 1215 Foundations of Eng (C-)		2	PHYS 2305 Found of Physics I w/lab Pre: MATH 1225; Co: MATH 1226		4
CLE (Area 2, 3, or 7)		3	ENGE 1216 Foundations of Eng (C-) Pre: ENGE 1215 (C-)		2
TOTAL		16	TOTAL		17
FALL SEMESTER SOPHOMORE 2018		Credits	SPRING SEMESTER SOPHOMORE 2019		Credits
CHEM 2535 Organic Chemistry Pre: CHEM 1036 or 1056 or 1056H OR CHEM 2565 Principles of Organic Chem Pre: CHEM 1036 or 1056 or 1056H		3 [F, SI] or 3 [F]	CHEM 2536 Organic Chem Pre: CHEM 2535 or 2565 OR CHEM 2566 Principles of Organic Chem Pre: CHEM 2565		3 [S, SI] or 3 [S]
CHEM 2545 Organic Chemistry Lab Pre: CHEM 1046 or 1066; Co: CHEM 2535		1 [F, SI]	CHEM 2546 Organic Chemistry Lab Pre: CHEM 2545, Co: CHEM 2536		1 [S, SI]
CHE 2114 Mass & Energy Balances (C-) Pre: MATH 1226, CHEM 1036 or 1056 or 1056H		3 [F, S]	CHEM 3615 Physical Chemistry Pre: CHEM 1036, MATH 2204, PHYS 2306		3 [F, S, SI]
PHYS 2306 Foundations of Physics I & Lab Pre: PHYS 2305, MATH 1226		4	CHE 2004 CHE Sophomore Seminar (P/F)		1 [S]
MATH 1114 Elem Linear Algebra OR MATH 2114 Intro to Lin Algebra Pre: (MATH 1225 (B) or 1226)		2 or 3	CHE 2164 CHE Thermodynamics (C-) Pre: 2114 (C-). Co: CHEM 3615		3 [F, S]
MATH 2204 Intro to Multivariable Calculus Pre: MATH 1226		3	MATH 2214 Intro to Differential Eqns Pre: MATH 1226, (MATH 1114 or 2114)		3
TOTAL		16	CLE (Area 2, 3, or 7)		3
			TOTAL		17
FALL SEMESTER JUNIOR 2019		Credits	SPRING SEMESTER JUNIOR 2020		Credits
ENGL 3764 Technical Writing		3	CHEM 3625 Physical Chemistry Lab Pre: CHEM 3615		1 [F, S, SI]
CHE 3114 Fluid Transport (C-) Pre: 2114, PHYS 2305, MATH 2204; Co: MATH 4564		3 [F, S]	CHE 3015 Process Measure & Control (C-) Pre: MATH 4564; Co: (2124 or 3124), 3184, 3044		3 [S]
CHE 3134 Separation Processes (C-) Pre: 2114; (2164 or CHEM 3615)		3 [F, S]	CHE 3044 Heat Transfer (C-) Pre: 2164, 3114, MATH 4564		2 [S]
CHE 3124 CHE Modeling (C-) Pre: 2114 (C-), MATH 2214; Co: 3114, MATH 4564		3 [F, S]	CHE 3144 Mass Transfer (C-) Pre: 2164, 3114, MATH 4564		3 [S]
MATH 4564 Operational Methods Pre: MATH 2214		3	CHE 3184 Chem Reactor Analysis & Des (C-) Pre: 2164, (MATH 2214 or 2214H); Co: 3144, 3044		3 [S]
TOTAL		15	STAT 4604 Stats Methods for Engrs Pre: MATH 1226 OR STAT 4705 Prob & Stat for Engrs Pre: MATH 2204 OR STAT 4714 Prob & Stat for EE Pre: MATH 2204		3
			TOTAL		15
SUMMER TERM I OR II 2020		Credits			
CHE 4014 CHE LABORATORY (C-) Pre: 3015, 3044, 3124, 3134, 3144, 3184, ENGL 3764		5 [SI, SI]			
TOTAL		5			
FALL SEMESTER SENIOR 2020		Credits	SPRING SEMESTER SENIOR 2021		Credits
CHE 4104 Process Materials (C-) Pre: 2164, (CHEM 2535 or CHEM 2565)		3 [F]	CHE 4186 Process & Plant Design (C-) Pre: 4185		4 [S]
CHE 4185 Process & Plant Design (C-) Pre: 4014		4 [F]	CLE (Area 2,3,7)		3
CLE (Area 2, 3, or 7)		6	CLE (Area 6)		1
Technical Elective		3	Free Electives		6
TOTAL		16	TOTAL		14

General Information about Checksheet: Superscripted annotation (F, S, SI, SII) in credits column indicates terms when a course is expected to be offered. The (C-) indicates a graduation requirement of a C- or better.

Curriculum for Liberal Education (CLE)

Consult the CLE Alphabetical Listing at: <http://www.cle.prov.vt.edu/guides/alpha.html>, CLE courses need to be completed prior to graduation

CLE Area 1: Writing and Discourse (6 hrs)	ENGL 1105	(3)	ENGL 1106	(3)
CLE Area 2: Ideas, Cultural Traditions, Values Electives (6 hrs)		(3)		(3)
CLE Area 3: Society & Human Behavior electives (6 hrs)		(3)		(3)
CLE Area 4: Scientific Reasoning and Discovery (8 hrs)	CHEM 1035/1045	(4)	CHEM 1036/1046	(4)
CLE Area 5: Quantitative and Symbolic Reasoning (8 hrs)	MATH 1225	(4)	MATH 1226	(4)
CLE Area 6: Creativity & Aesthetic Experience elective (1 hr)				(1)
CLE Area 7: Global Issues Elective (3 hrs)				(3)

If a CLE course is double-counted to satisfy two different CLE areas, a free elective(s) must be taken to maintain a minimum of 131 credits.

Electives: CHE majors must take 3 hrs of Technical elective the approved list. If more than 3 hrs are taken, the excess hours count toward Free Electives. Technical Electives must be taken A-F, not P/F.

Change of Major Requirements: Please see: <http://www.enge.vt.edu/undergraduate-changing-majors.html>

Foreign Language Requirements: Students must have had 2 years of a foreign language in high school or one year at the college level (6 credit hours) of the same language. College-level credits used to meet this requirement do not count towards the degree.

Satisfactory Progress Towards Degree: University Policy 91 outlines university-wide minimum criteria to determine if students are making satisfactory progress towards the completion of their degrees. The CHE Department fully supports this policy. Specific expectations for satisfactory progress for Chemical Engineering majors are as follows:

- Each student must meet the minimum University-wide criteria as described in Policy 91 and summarized in the Undergraduate Catalog (under Academic Policies)
- Students must make C- or better in all ChE-prefix courses and maintain a minimum in-major GPA of 2.0. (All ChE credits except CHE 4144: Bus & Mktg for Proc Industries are used to calculate in-major GPA.)
- If in-major GPA drops below 2.0, students will be placed on departmental probation.
- If an in-major GPA of 2.0 or better is not achieved after two semesters of departmental probation, the student is suspended from the department and prohibited from registering for ChE courses for at least one semester.
- Following suspension, permission of the ChE department head is required for registration in ChE courses.

Prerequisites:

- Prerequisites for each course are listed after the course title. The (letter grade) notation, such as (C-), indicates the minimum grade students must earn in the prerequisite course.
- There are no hidden prerequisites in this program of study.
- Prerequisites may change from what is indicated. Be sure to consult the University Catalog or check with your advisor for the most current requirements.
- Entry into CHE 4014 and 4185 is restricted to students who have a C- or better in all CHE-prefix courses.

Graduation Requirements:

- Have a minimum in-major GPA of 2.0. (All ChE credits except CHE 4144: Bus & Mktg for Proc Industries are used to calculate in-major GPA.)
- Complete at least 131 semester credit hours with a minimum overall GPA of 2.0.

CHEMICAL ENGINEERING DEPARTMENT**TECHNICAL Electives – Approved Courses**
(For students graduating 2021)**APPROVED**
University Registrar

The following courses are approved Technical Electives **FOR STUDENTS GRADUATING in 2021**. Be sure to check the pre-requisites, co-requisites, and credit hours as listed in the University Catalog. If you do not have the pre-requisites and co-requisites, talk with the instructor for permission to take the class. The list may be updated during the year; be sure to get an up-to-date copy from the Chemical Engineering office at the time you choose the technical electives. The course(s) you choose must be on the approved list in effect at the time you take the course(s).

Three hours of technical elective are required. If you take more than three hours, the excess hours will count toward Free Electives. **All Technical Electives must be taken A-F.**

<u>Discipline</u>	<u>Course No.</u>	<u>Course Title</u>	<u># Credits</u>
Biochemistry	2024	Concepts of Biochemistry	3
	3114	Biochem. for Biotechnology & Life Sci.	3
	4115,4116	General Biochemistry	4,3
Biomedical Engineering			
	2104	Intro to Biomedical Engineering	3
Chemical Engineering			
Any ChE course not required in the ChE undergraduate curriculum may count as a technical elective (EXCEPT 4144 Bus. & Mktg. for Proc. Indus.). Some examples:			
	4214	Intro to Polymer Materials	3
	4224	Intro to Polymer Processing	3
	4304	Biological Transport Phenomena	3
	4334	Intro to Colloid Interface Sci	3
	4544/BSE 4544	Protein Separation Engineering	3
	4994/4974*	Independent Study/Undergraduate Research	1-3
Chemistry	2114, 2124	Analytical Chem & Lab	3, 1
	2424	Descriptive Inorganic Chemistry	3
	2555, 2556	Organic Synthesis & Techniques Lab	2, 2
	3616, 3626	Physical Chemistry & Lab	3, 1
	4616	Physical Chemistry for the Life Sciences	3
	4074/MSE 4544	Laboratory in Polymer Science	2
	4114	Instrumental Analysis	4
	4124	Advanced Instrumental Techniques	2
	4404	Physical Inorganic Chemistry	3
	4414	Inorganic Chemistry Lab	2
	4514	Green Chemistry	3

	4524	Identification of Organic Compounds	3
	4534	Organic Chemistry of Polymers	3
	4554	Drug Chemistry	3
	4634	Polymer and Surface Chemistry	3
	4994	Undergraduate Research	1-3
Civil and Environ Eng	5104	Environmental Chemistry	3
Engineering	3124	Introduction to Green Engineering	3
Eng Sci&Mech	2214	Statics and Mechanics of Materials	3
Envir. Sci.	4734/CSES 4734	Environmental Soil Chemistry	3
Food Sci. & Technology	4504	Food Chemistry	3
	4514	Food Analysis	3
Materials Sci & Eng	3204	Introduction to Electronic Materials	3
Nuclear Sci & Eng	3145	Fundamentals of Nuclear Engr	3
Physics	3324	Modern Physics	4
	4564	Polymer Physics	3
Sustainable Biomaterials	3434	Chem & Conv of Sust Biomats	3
	3444	Sustainable Biomaterials & Bioenergy	3

*CHE 4994/Undergraduate Research (UR) and CHE 4974/ Independent Study (IS) cannot be added through online request. Instead, the student should talk with a faculty member about a research project, complete the request for approval to take CHE 4994 or 4974 (the form is available online), and **return it to Jane Price (CHE main office) by the first day of classes**. To be eligible to take 4974 or 4994, your overall and in-major GPA must be at least 2.0.

If there is a course you are interested in taking and it is not on the approved list, talk to Dr. Goldstein for approval to substitute a course.