

CHEMICAL ENGINEERING MAJOR

Chemical engineering combines principles of chemistry, physics, biology, and mathematics to design processes that economically and sustainably meet human needs for energy, food, healthcare, and technology. Chemical engineers are not only leaders in traditional chemical, oil and gas, and brewing industries, but they are also at the forefront of advancements in pharmaceutical discovery and production, renewable energy, biotechnology, and environmental protection. The Chemical & Biomolecular Engineering (CBE) curriculum includes basic coursework in math, physics, and chemistry, as well as advanced courses related to the design of industrial processes including fluid dynamics, thermodynamics, heat and mass transfer, computer methods, reactor design, and automatic process control. All students participate in an internship through the core curriculum. Students can readily tailor the major to their specific interests through choice of appropriate electives; synergistic focus areas include pre-medicine, biotechnology, materials science, energy, and environmental studies.

Tulane's Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET (<https://www.abet.org/>).

Requirements

Core Chemical Engineering Curriculum

The Chemical Engineering (CENG) program of study requirements include a solid foundation in math and science, major-specific core material in chemical and biomolecular engineering, plus exposure to the humanities and social sciences. In order to graduate with a B.S. degree in Chemical Engineering, students must fulfill the following requirements:

Major Specific: The engineering courses, including the core chemical engineering courses*, engineering and technical electives, and the advanced specialization electives. *A minimum grade of C- must be earned in each CENG required core course in order to receive credit for the Bachelor's degree.

Newcomb-Tulane College (NTC) Core Curriculum: (https://advising.tulane.edu/sites/default/files/Core_Curriculum_Checklist.pdf) Courses that ensure attainment of basic competencies in writing, scientific inquiry, cultural knowledge, and interdisciplinary scholarship.

Public Service: One service learning course at the 1000-3000 level no later than the fifth semester, and a subsequent second-tier public service requirement. More information on the service learning requirements can be found here (<https://cps.tulane.edu/about/graduation-requirement/>). The CBE department offers courses which satisfy both the lower and upper-level service learning requirements (CENG 1180/1891 and CENG 3240/3890).

Certain modifications to the freshmen program may be made by:

- Achievement of advanced standing through Advanced Placement Tests offered by the CEEB
- Use of advanced placement tests in mathematics and chemistry offered on campus during Orientation Week
- Submission of transcripts from other universities for equivalent courses taken prior to entering Tulane

Major Advising

New majors are assigned an individual faculty advisor based on their expected graduation year, and they should consult with him or her regularly for class and career planning. Faculty members can be reached by email or in person to set up meeting times.

Class of 2025 - Dr. Russell (krussell1@tulane.edu), Dr. Sandoval (nsandova@tulane.edu)

Class of 2026 - Dr. Russell (krussell1@tulane.edu), Dr. Albert (jalbert6@tulane.edu)

Class of 2027 - Dr. Godbey (godbey@tulane.edu), Dr. Russell (krussell1@tulane.edu)

First-year students - Dr. Godbey (godbey@tulane.edu)

Special advising for transfer students, Tulane/Xavier 3-2 program, study abroad – Dr. Godbey (godbey@tulane.edu)

Year 1		Credit Hours
Fall		
CHEM 1070 & CHEM 1075	General Chemistry I and General Chemistry Lab I	4
MATH 1210	Calculus I	4
PHYS 1310 & PHYS 1311	General Physics I and General Physics I Lab	4
TIDES		1
ENGL 1010	Writing	4
Credit Hours		17

Spring

CHEM 1080 & CHEM 1085	General Chemistry II and General Chemistry Lab II	4
PHYS 1320 & PHYS 1321	General Physics II and General Physics II Lab	4
MATH 1220	Calculus II	4
CENG 1180	Impacts in Chem Engineering (*recommended course)	1
CENG 1890	Service Learning (*recommended tier-1 service learning)	0
NTC Core		3

Credit Hours **16**

Year 2**Fall**

CENG 2110	Matl & Energy Balances	3
CENG 2500	Intro To Biotechnology	3
Engineering Elective *CENG 2230 recommended **		3
CHEM 2410 & CHEM 2415	Organic Chemistry I and Organic Chemistry Lab I	4
MATH 2210	Calculus III	4

If, because of advanced placement, a student does not need to take one of the above courses, he/she should be enrolling in CENG 2120 - Thermodynamics I

Credit Hours **17**

Spring

CENG 2120	Thermodynamics I	3
CENG 2320	Transport I: Fluids	3
CHEM 2420 & CHEM 2425	Organic Chemistry II and Organic Chemistry Lab II	4
MATH 2240 or MATH 4240	Intro To Applied Math or Ordinary Differentl Equa	4

Credit Hours **14**

Year 3**Fall**

CENG 3110	Thermodynamics II	3
CENG 3390	Transport II: Heat and Mass	3
CENG 3230	Numr Meth For Chem Eng	3
Advanced Specialization Elective 1 **		3 or 4
NTC Core		3

Credit Hours **15-16**

Spring

CENG 3240	Unit Operations Lab	4
CENG 3340	Separation Processes	3
CENG 4150	Reactor Design	3
CENG 3890	Service Learning (*recommended tier-2 service learning)	0
Advanced Specialization Elective 2 **		3 or 4
NTC Core		3

Credit Hours **16-17**

Year 4**Fall**

CENG 4310	Chemical Process Design	3
CENG 4750	Practice School **Practice School is ONLY offered in the FALL of senior year.	6
NTC Core		3

Credit Hours **12**

Spring

CENG 4500	Chemical Process Control	3
Advanced Engineering Elective **		3
Advanced Technical Elective **		3
NTC Core		3
NTC Core *if needed	Minimum of 121 credit hours required in the degree	3
Credit Hours		15
Total Credit Hours		122-124

**** CENG Elective Requirements**

In general, a Technical Elective is a course offered by the School of Science and Engineering. An Engineering Elective is any non-required CENG course, a course offered by one of the engineering departments (BMEN, ENGP, RCSE), or a course offered by Computer Science (COSC and CMPS). Advanced Specialization Electives are typically selected from the following list:

- Any 3000-level or above CENG, BMEN, CHEM, CMPS, COSC, ENGP, MATH, MPEN, PHYS, or RCSE
- CELL 3030: Molecular Biology
- CELL 3750: Cell Biology (pre-req: CELL 3030)
- EENS 3150: Intro to Geographic Information Systems
- EENS 4030: Advanced Geographic Information Systems
- EENS 4250: Isotopes in the Environment
- EENS 4360: Environmental Geochemistry (pre-req: EENS 2110)
- ENRG 4100: Energy Markets, Economics, and Policy
- ENRG 4110: Energy Financial Modeling
- ENRG 4200: Energy Fundamentals and Trading
- SPHU 3160: Biostatistics in Public Health (pre-req: SPHU 1010 and 1020)
- SPHU 4160: Intro to Statistical Packages (pre-req: SPHU 3160)
- SPHU 4400: Practical Bioinformatics
- SPHU 4410: Data & Information Management in Public Health (pre-req: SPHU 1010 and 1020)

Any Substitutions must follow the Petition for Degree Plan Modification process.

The Engineering Electives must satisfy a minimum of 6-credit hours with at least 3-credit hours at the 3000-level or above. The Advanced Specialization Electives must satisfy a minimum of 6-credit hours at the 3000-level or above. The Advanced Technical Elective must satisfy a minimum of 3-credit hours at the 3000-level or above. Additionally, courses containing significant overlap with core curriculum are excluded, and courses for non-science majors do not fulfill the elective requirements. Note that a maximum of 3-credit hours can be satisfied from Professional Development Courses; note a maximum of 6-credit hours can be satisfied by Independent Study/Honor's Thesis work. **Students are encouraged to inquire with their CBE Advisor or the Undergraduate Committee Chair if they are unsure about a potential elective.**

Courses Excluded from satisfying the Engineering Elective, Advanced Specialization Elective, and Technical Elective requirements: Seminar Courses, MATH 3000: Computational Problem Solving (excluded due to lack of rigor), MATH 3310: Scientific Computing (excluded due to overlap with CENG 3230: Numerical Methods), MATH 2240: Introduction to Applied Math or MATH 4240: Ordinary Differential Equations (students may take either to satisfy degree requirements, the parallel course is excluded due to overlap), and any course of lower technical rigor than the benchmark freshman-level course in the providing department.

**Students may take courses from a biochemistry series offered by either Chemical and Biomolecular Engineering (CENG 4450 and 4460) or Chemistry (CHEM 3830 and 3840) to satisfy one or both courses of the Advanced Specialization Elective requirement. Once a biochemistry course has been taken and a grade of D- or better has been granted, the parallel course from the other department cannot be taken to satisfy any elective requirement for the Chemical Engineering degree. As an example, a student who withdraws from CHEM 3830 can take CENG 4450 to satisfy the first Advanced Specialization requirement. If the student then goes on to earn credit for both CENG 4460 and CHEM 3840, one of the courses can be used for elective credit but the other 'biochemistry II' course will not be counted as an elective, technical or otherwise.