Johnson County Community College
**Transfer Program to University of Missouri**
**Chemical Engineering, BS with a**
**Biochemical Emphasis; Materials Emphasis**
**Environmental Emphasis**
**2024-2025 Catalog**

**CONTACT:** Engineering Advising Office
**PHONE: (573) 884-6961**
**EMAIL:**muengradvising@missouri.edu
**HOME PAGE:**
https://majors.missouri.edu/chemical-engineering-bs/

The **Chemical Engineering** curriculum provides a well-rounded general education and rigorous technical education in order to hone an appreciation of the relationship between technology and society. The technical curriculum focuses on the basic sciences, as well as chemical engineering theory and practice. Throughout the curriculum, problem solving, design, critical thinking, and teamwork skills are built by integrating team-based design projects, laboratories, and reports. Our graduates work in traditional chemical engineering areas such as the petroleum and chemical industries, as well as microelectronics, pharmaceuticals, materials, polymers, environmental protection, consumer products, and engineering consulting. Our graduates also pursue careers in business management or government as well as advanced studies in medicine, law, business, basic sciences, and other engineering disciplines.

The **biochemical emphasis** builds on the core Chemical Engineering curriculum to create expertise in chemical reactions associated with biological processes. Students achieving this emphasis area will be exposed to basic concepts of living systems, metabolism, biological polymers, hormones, and basic genetics through courses in biology and biochemistry, as well as biomass, enzyme, yeast, and other biochemical processes, including the associated industrial operations. Students completing this emphasis will be well-poised for careers in biomedical engineering, human or veterinary medicine, pharmaceuticals, and agricultural/food engineering. Students will also be in a strong position to pursue graduate degrees in biological or biomedical engineering, dentistry, or human or veterinary medicine.

The **environmental emphasis** builds on the core Chemical Engineering curriculum to provide students an opportunity to explore courses centered around environmental engineering, wastewater treatment, and environmental regulation. A major focus of this emphasis is to prepare students for careers in policy, industry, or research. A student who completes this emphasis will also be in a position to pursue a graduate degree in programs focused on environmental science and engineering.

The **materials emphasis** builds on the core Chemical Engineering curriculum to include courses of interest to students who wish to pursue careers and/or interests in materials science and solid-state physics. The emphasis area requirements cover basic topics in materials science, after which the student is asked to choose at least one course covering a more specific area of materials: ceramics, polymers, biological materials, or composites. Students are then free to choose electives in other areas, including optical materials, semiconductors, advanced materials, structural materials, and materials characterization. Students selecting the materials emphasis have all the advantages of an education in chemical engineering along with specialized knowledge of materials, giving them a valuable base from which to build a career.

**Major Program Requirements -** Each graduate must complete the required curriculum designed to demonstrate knowledge and integration of chemical engineering science and practice using analytical, computational, and experimental techniques. Students are also required to complete one cultural awareness course which is selected from an approved list, created and maintained by the College of Engineering or which meets the Arts and Science (A&S) diversity requirement. In addition, each graduate must have a comprehensive background in advanced chemistry. Graduates have a detailed working knowledge of the entire spectrum of chemical engineering activities.

All requirements listed below are in addition to University graduation requirements, including University general education and College of Engineering requirements. Students may also add an emphasis in the Biochemical, Environmental, or Materials areas by completing that emphasis area's requirements.

Refer to JCCC/MU General Education guide for equivalent courses.

**Transfer Students -** Students wishing to transfer to MU from an accredited college or university are subject to University regulations described in this catalog. The College of Engineering cooperates with many colleges through articulation agreements that help students transfer to MU with maximum ease and minimum loss of credits. A student may contact the College of Engineering Admissions Office to determine if their home institution participates in an agreement with the College of Engineering. Students who have completed all courses specified in the articulation agreement will be admitted into their desired degree program. All other transfer students are admitted on program discretion. Typically, transfer students with freshmen status must satisfy the same requirements as students entering college for the first time. Other students are admitted only after review of their transcript.

To be recommended for a BS degree from the College of Engineering, a student transferring from an accredited institution must complete at least 30 upper-level credits in the degree program at a UM System campus. At least 21 of the 30 credits must be upper-level engineering courses approved by the department awarding the degree.
A student transferring with senior standing from another UM System campus must complete the last 15 credits in residence on the campus where the degree program is located. Twelve of these 15 credits must be in engineering and approved by the department awarding the degree.

Any student whose enrollment in any college-level academic program resulted in dismissal, departure or who is on probation will not be admitted to the College of Engineering.

**International Admission -** International undergraduate students interested in studying in the College of Engineering can find information on academic and English language admission requirements on the website of the MU Office of International Admissions. Any questions regarding international student admissions can be directed to that office at inter@missouri.edu.

**GPA Requirements for Graduation from the College of Engineering:**

- GPA of record of at least 2.0
- GPA of at least 2.0 in all engineering courses offered by one of the four campuses of the UM System. "Engineering courses" include all courses that are offered through the College of Engineering or its equivalent on the four campuses, or that have "Engineering" in the curricular designator. Only the last grade in a repeated course will be used in the calculation.

| MU Requirements | Hrs | JCCC Equivalents | Hrs |
|---|---|---|---|
| **Required entry-level courses** | | | |
| MATH 1500 Analytic Geometry and Calculus I | 5 | MATH 241 Calculus I* | 5 |
| MATH 1700 Calculus II | 5 | MATH 242 Calculus II* | 5 |
| MATH 2300 Calculus III | 3 | MATH 243 Calculus III* | 5 |
| MATH 4100 Differential Equations | 3 | MATH 254 Differential Equations* | 4 |
| PHYSCS 2750 University Physics I | 5 | PHYS 220 Engineering Physics I* | 5 |
| PHYSCS 2760 University Physics II | 5 | PHYS 221 Engineering Physics II* | 5 |
| CHEM 1400/1401 College Chemistry I/Lab | 4 | CHEM 124/125 General Chemistry I Lecture*Lab* | 4/1 |
| CHEM 1410/1411 College Chemistry II/Lab | 4 | CHEM 131/132 General Chemistry II Lecture*/Lab* | 4/1 |
| CHEM 2100/2130 Organic Chemistry I/Lab | 3/2 | CHEM 220 Organic Chemistry I* | 5 |
| CHEM 2110 Organic Chemistry II | 3 | CHEM 221 Organic Chemistry II* | 5 |
| BIO SC 1500 Introduction to Biological Systems with Laboratory | 5 | BIOL 135 Principles of Cell and Molecular Biology | 4 |
| **Additional Requirements** | | | |
| ECONOM 1015 Principles of Macroeconomics **OR** ECONOM 1014 Principles of Microeconomics | 3 | ECON 230 Principles of Macroeconomics **OR** ECON 231 Principles of Microeconomics | 3 |
| Humanities | 9 | Refer to JCCC/MU General Education guide | 9 |
| Social/behavioral sciences | 6 | Refer to JCCC/MU General Education guide | 6 |
| A 2000 level or greater course in humanities or social/behavioral sciences as part of 18 CR of humanities and social sciences | 3 | Refer to JCCC/MU General Education guide | 3 |
| One general elective | 3 | Refer to MU – Columbia Course Equivalency database. | 3 |

| **Emphasis Requirements** | | | |
|---|---|---|---|
| BIO_SC 1500 Introduction to Biological Systems with Laboratory (Biochemical Emphasis) | 5 | BIOL 135 Principles of Cell and Molecular Biology | 4 |
| ENGINR 1200 Statics and Elementary Strength of Materials (Materials Emphasis) | 3 | ENGR 251 Statics* | 3 |

* JCCC course has a prerequisite or corequisite.

**It is the STUDENT'S RESPONSIBILITY to check for updates to all transfer information. This transfer guide is provided as a service and is updated as needed. Degree requirements at the four-year colleges are subject to change by those institutions. To ensure you have the most accurate up to date information about the program, it is imperative you meet with an advisor at the transfer institution.**