Biochemical Engineering

Department of Chemical and Biochemical Engineering

Biochemical engineering is a **specialty area of chemical engineering** that deals with changing the composition, energy content and state of aggregation of materials. As a biochemical engineer you will consider the fundamental properties and nature of matter, the forces that act on matter, and the precise expressions of the relationships between them.

You may study ways in which pure water can be obtained from the sea; design processes to provide fertilizers, rubber, fibers and fuels; or team up with other engineers and scientists in biomedical engineering to develop specialized polymeric materials for use in artificial limbs and other human organs. You may be instrumental in finding supplemental food sources. You might help develop new processes for the application of biochemistry, energy conservation or environmental controls.

With a chemical engineering degree you will have the opportunity to pursue a broad range of job fields such as manager, research engineer, and a consultant. Employment is available in a wide variety of fields such as health, food, agriculture, and petroleum. Each year 1-in-5 graduates continue their studies in graduate or professional schools. Few fields offer more fascinating or diverse career opportunities.

Missouri S&T's ABET-accredited program combines basic science and engineering principles with a strong emphasis in design and a solid technical knowledge.

If you're interested in...

- Problem solving: chemical engineers have the opportunity to work on complex problems and develop new products
- Helping people: chemical engineers have the opportunity to discover ways to produce new products
- Management: chemical engineers have the chance to manage production processes

Research Opportunities

Undergraduate research opportunities are available through the OURE program as well as many faculty-sponsored projects. The chemical engineering, biological sciences and chemistry departments are located in the same building. Many current research projects involve faculty members from multiple disciplines. This provides undergraduates with interdisciplinary interests an excellent opportunity to do research in these areas while working on a degree in chemical/biochemical engineering.

Student Organizations

There is a very active student chapter of the American Institute of Chemical Engineers. Students in the department are also involved in Omega Chi Epsilon, the chemical engineering honor society. Many students also participate in Tau Beta Pi—the engineering honor society—and Alpha Chi Sigma—a service society for students in chemical related fields.

Cooperative and Internship Education Program

Co-op and summer intern programs are available to students. These programs provide students with the opportunity to integrate their classroom studies with learning through productive work experiences in a field related to their academic or career goals. Work for a semester or during the summer and build your resume.

Top Hiring Employers

ExxonMobil	Dow Chemical
Anheuser Busch	Proctor & Gamble
Cargill	The Solae Companies
DuPont	BASF
3M	Government & Military Employers

Departmental Contact Information:

Department Chair:	Dr. Muthanna Al-Dahhan
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chemeng.mst.edu	chemeng@mst.edu

James E. Bertelsmeyer Hall

In the fall of 2014 a new $22.3mil chemical and biochemical engineering building will open at Missouri S&T.

Faculty

Professors:
- Muthanna Al-Dahhan, Washington University (Chair)
- Daniel Forciniti, Ph.D., North Carolina State
- Athanasios Liapis, Ph.D., Swiss Federal Institute of Technology
- Douglas Ludlow, Ph.D., Arizona State
- Parthasakha Neogi, Ph.D., Carnegie Mellon
- Sunggyu "KB" Lee, Ph.D., Case Western Reserve
- Joseph Smith, Ph.D., Bringham Young

Associate Professors:
- Oliver Sitton, Ph.D., Missouri S&T
- Jee-Ching Wang, Ph.D., Maryland
- Yangchuan Xing, Ph.D., Yale
- David Westenberg, Ph.D., Michigan State

Assistant Professors:
- Xinhua Liang, Ph.D., Colorado

Emeritus Faculty:
- Neil Book, Ph.D., Colorado
- Orrin Crosser, Ph.D., Rice
- David Manley, Ph.D., Kansas
- Nicholas Morosoff, Ph.D., NYU-Poly
- Gary Patterson, Ph.D., Missouri S&T
- Stephen Rosen, Ph.D., Cornell

Registered Professional Engineer

Minor Programs and Emphasis Areas

A minor in chemical engineering is available. Requirements are outlined in Missouri S&T's course catalog, available online at **registrar.mst.edu**. Related degree programs and minors at S&T:

- Bachelor of Science, Chemical Engineering (without Biochemical Engineering emphasis)
- Bachelor of Science, Chemistry
- Bachelor of Science, Chemistry w/ Biochemistry emphasis
- Bachelor of Science, Chemistry w/ Pre-Med emphasis
- Bachelor of Science, Chemistry w/ Polymers & Coatings Science emphasis
- Bachelor of Arts, Chemistry
- Bachelor of Science, Biological Sciences
- Bachelor of Arts, Biological Sciences
- Minor, Chemical Engineering
- Minor, Chemistry
- Minor, Bioinformatics
- Minor, Pre-Med

Scholarship Information

Freshman scholarships are available through the department. Scholarships ranging from $500 to $6,000 for sophomores, juniors and seniors typically require an application and are based on academic record, service activities and extracurricular activities. Approximately 33% of chemical engineering students receive departmental scholarship support.

Notes

Detailed information on course equivalencies, acceptable credits for elective coursework, grade requirements and prerequisites is available from S&T's Registrar's Office at **registrar.mst.edu**.

All chemical engineering students must take the Fundamentals of Engineering Examination prior to graduation. A passing grade is not required, however, this is the first step to becoming a registered professional engineer.

Bachelor of Science

Chemical Engineering w/ Biochemical Engineering emphasis ..... 128 credit hours

Entering freshmen desiring to study Chemical Engineering are admitted to the Freshman Engineering Program. They can, however, state a Chemical Engineering preference, which will be used as a consideration for available freshman departmental scholarships. The focus of the Freshmen Engineering program is on enhanced advising and career counseling, with the goal of providing to the student the information necessary to make an informed career decision.

FIRST YEAR — Credit

Chemistry 1310, 1319-General Chemistry I w/ Lab	5
Chemistry 1320-General Chemistry II	3
English 1120-Exposition	3
Math 1214-Calculus for Engineers I	4
Math 1215-Calculus for Engineers II	4
Physics 1135-Engineering Physics I	4
FE 1100-Careers in Engineering	1
MechE 1720-Engineering Design	3
ChemE 1100-Computers and Chemical Engineering	3
History 1200, 1300, 1310 -or- Pol Sci 1200	3
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SECOND YEAR

Bio Sci 2213, 2219-Cellular Biology w/ Lab	4
Bio Sci 3313, 3319-Microbiology w/ Lab	5
Chemistry 2210-Organic Chemistry I	3
Math 2222-Calculus III/Analytic Geometry	4
Math 3304-Elementary Differential Equations	3
Physics 2135-Engineering Physics II	4
ChemE 2100-Chemical Materials	3
ChemE 2110-Chemical Thermodynamics I	3
ChemE 2300-Chemical Processes	3
Chem 2220, 2289-Organic Chemistry II w/ Lab	4
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THIRD YEAR

Bio Sci 4323, 4329-Molecular Genetics w/ Lab	5
ChemE 2310-Prof Practices & Ethics	1
ChemE 3100-Fluid Flow	3
ChemE 3110-Heat Transfer	2
ChemE 3130-Staged Mass Transfer	3
ChemE 3120-Chemical Thermodynamics II	3
ChemE 3160-Molecular Chem Eng	3
ChemE 3200-Biochem Separations	3
Chemistry 3410-Physical Chemistry	3
Elective/General Education	3
Econ 1100 or 1200-Micro or Macroeconomics	3
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FOURTH YEAR

ChemE 4110, 4120-Proc Dyn & Cont w/ Lab	4
ChemE 4200-Biochem Separations Lab	2
ChemE 3150-Reactor Design	3
ChemE 4096-Chem Engr Economics	2
ChemE 4220-Bioreactor Lab	3
ChemE 4097-Process Design	3
ChemE 4210-Biochem Reactors	3
Elective/General Education	3
Elective/General Education	3
Elective/General Education	3
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