

# Department of Chemical and Biological Engineering

## Department Head/Assoc. Professor:

Abigail Richards, Ph.D.

Email: arichards@montana.edu (jeffrey.heys@coe.montana.edu)

Montana State University

214 Roberts Hall

PO Box 173920, Bozeman, MT 59717-3920

406-994-2221 Department Email: chbe@montana.edu

Home Page: [www.chbe.montana.edu](http://www.chbe.montana.edu) (<http://www.chbe.montana.edu>)

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## Admission (M.S. and Ph.D.)

Students may enter the Master of Science or Doctoral programs with a bachelor's degree in Chemical Engineering or other engineering or science discipline. Non-chemical engineering students wishing to pursue a master's program may require limited remedial coursework. Students may be admitted directly to the doctoral program without a master's degree. To learn more about the application process, deadlines, test scores, and more, please visit the department graduate pages: <http://www.chbe.montana.edu/grad/index.html>. (<http://www.chbe.montana.edu/grad/>)

## Research

This degree involves research in transport phenomena in complex systems, materials, biofilms, biochemical transformation, biotechnology, remediation of hazardous wastes, and environmental engineering. Research topics include extremophilic bioprocessing, in situ biocatalyzed heavy metal biotransformations in natural and engineered biological systems, biomaterials, biorheology, colloidal system dynamics, durability of materials, surface interactions, membrane materials, composite materials, separations, metabolic engineering, metabolic systems analysis, biofuels processing.

Some departmental research is conducted in collaboration with the Center for Biofilm Engineering, the Thermal Biology Institute and MSU's Surface Science Program. Research also includes materials science and engineering for energy applications including: high temperature corrosion and corrosion protection, advanced physical vapor deposition (PVD) technologies, and sustainable energy.

## Financial Assistance

Research and teaching assistantships and scholarships are available on either a 9-month or a 12-month basis; only MS Plan A and Ph.D. candidates are eligible for research and teaching assistantships. Master of Engineering students are eligible for scholarships through the department and graduate school.

## Degree Offered

- M.Eng. in Bioengineering (<http://catalog.montana.edu/graduate/engineering/chemical-biological-engineering/master-engineering-bioengineering/>)
- M.Eng. in Chemical Engineering (<http://catalog.montana.edu/graduate/engineering/chemical-biological-engineering/master-engineering-chemical-engineering/>)
- M.S. in Bioengineering (<http://catalog.montana.edu/graduate/engineering/chemical-biological-engineering/ms-bioengineering/>)
- M.S. in Chemical Engineering (<http://catalog.montana.edu/graduate/engineering/chemical-biological-engineering/ms-chemical-engineering/>)

- M.S. in Environmental Engineering (<http://catalog.montana.edu/graduate/engineering/environmental-engineering/>)
- Ph.D. in Chemical Engineering (<http://catalog.montana.edu/graduate/engineering/engineering-phd/chemical-engineering/>)
- Ph.D. in Materials Science (<http://catalog.montana.edu/graduate/letters-science/chemistry-biochemistry/phd-materials-science/>)
- Ph.D. in Engineering - Environmental Engineering Option ([http://catalog.montana.edu/graduate/engineering/engineering-phd/#Environmental\\_Engineering](http://catalog.montana.edu/graduate/engineering/engineering-phd/#Environmental_Engineering))

## Program Requirements (M.S. and Ph.D.)

The Master of Science program requires 30 credits total (including a minimum of 10 credits of ECHM 590 Master's Thesis for Plan-A option). The chemical engineering program for students from other disciplines requires appropriate remedial coursework in addition to the previously listed requirements.

The Ph.D. program requires specific coursework, depending on the option, 60 total credits (including a minimum of 18 thesis credits). For students entering with a Masters degree, up to 24 graded credits may be applied. However, the Scientific Communication and Proposal Development (ENGR 650) and Rsch & Mthds in Engineering (ENGR 610) requirements must still be taken at Montana State University.

Course requirements for the Chemical Engineering Ph.D. include completion of 2 credits of ENGR 610 Rsch & Mthds in Engineering, 2 credits Scientific Communication and Proposal Development (ENGR 650), 9 credits of disciplinary chemical engineering courses (ECHM 503, ECHM 533, ECHM 510), a minimum of eighteen (18) credits of doctoral dissertation, and other courses chosen to support the proposed doctoral program that are approved by the candidate's committee. All doctoral candidates will be required to pass three examinations: a Ph.D. Qualifying Examination taken during the first year of the student's doctoral program, a Ph.D. Comprehensive Examination taken within two years of qualifying for the doctoral program, and a Ph.D. Dissertation Defense. Students are expected to be familiar with the individual program degree requirements as well as those of The Graduate School.