

BIOLOGICAL ENGINEERING - MASTER OF SCIENCE (MS)

The Master of Science degree in Biological Engineering requires 30 hours of approved credit hours. Students may choose a thesis or a non-thesis option for the degree.

For more information, visit the department's Prospective Graduate Student webpage.

Note: The department does not accept students interested in a terminal master's degree except under special circumstances. Students generally obtain the Biological Engineering Master of Science (MS) in the course of fulfilling the requirements for the Biological Engineering - Doctor of Philosophy (PhD).

Requirements

The following course requirements are subject to change; for the most current information, please visit the department's Biological Engineering (<https://www.colorado.edu/chbe/graduate-program/biological-engineering-phd-program/>) and Prospective Graduate Students (<https://www.colorado.edu/chbe/graduate-program/prospective-graduate-students/>) webpages.

All candidates for the Master of Science degree in Biological Engineering must complete at least 30 credits. Only courses 5000-level and above may be applied towards the MS degree. Fifteen of the total required credits must be courses from BIEN or CHEN, and pass/fail courses do not count toward the degree. An advisor must approve all courses without a BIEN or CHEN designation. Only those courses for which the student receives a grade of B- or better will count toward the MS degree. A course grade below B- will not be counted toward the minimum requirements for the MS degree, but it will be considered in the overall grade-point average. The overall grade point average must be 3.00 or better.

All students are required to complete two core courses: CHEN 5150 and CHEN 5160, which are three credits each. As part of the 30 credits, each student must also take at least three credits in each of the following categories: data/analysis elective, biology or biological engineering elective, and technical elective.

Code	Title	Credit Hours
CHEN 5150		3
CHEN 5160		3

Options

There are two options that students may choose for a Biological Engineering MS degree:

MS with Thesis

A candidate for the Master of Science degree in Biological Engineering with thesis must complete at least 30 credits, comprised of at least 24 credits of coursework, including both CHEN 5150 and CHEN 5160, and 4–6 credits of MS thesis credit (CHEN 6950 (<https://catalog.colorado.edu/search/?P=CHEN%206950>)). A successful oral defense and submission of the MS thesis is also required.

MS without Thesis

A candidate for the Master of Science degree in biological engineering without thesis must complete at least 30 credits, including both CHEN 5150 and CHEN 5160. CHEN 6950 is not required. A final examination is not required.

Plan(s) of Study

Year One

Fall Semester		Credit Hours
CHEN 5150		3
CHEN 5900		3
BIEN 5806	Immunoengineering	3
Credit Hours		9

Spring Semester

CHEN 5160		3
MCDB 5425	Topics in Membrane Biology: Cell Biology, Physiology and Disease	3
CHEN 5840	Independent Study	3
Credit Hours		9

Year Two

Fall Semester

GRAD 5000	Responsible Conduct of Research	1
BCHM 5312	Quantitative Optical Imaging	3
CHEN 5460	Polymer Engineering	3
Credit Hours		7

Spring Semester

CHEN 6950	Master's Thesis	5
Credit Hours		5
Total Credit Hours		30

Year One

Fall Semester		Credit Hours
CHEN 5150		3
BIEN 5806	Immunoengineering	3
MCDB 5615	Biology of Stem Cells	3
Credit Hours		9

Spring Semester

MCDB 5425	Topics in Membrane Biology: Cell Biology, Physiology and Disease	3
CHEN 5160		3
BMEN 5292		3
BIEN 5802	Tissue Engineering and Biofabrication	3
Credit Hours		12

Year Two

Fall Semester

BIEN 5804	Protein and Enzyme Engineering	3
BIEN 5803	Metabolic Engineering	3
BCHM 5312	Quantitative Optical Imaging	3
Credit Hours		9
Total Credit Hours		30

Learning Outcomes

By the completion of the program, students will be able to:

- Demonstrate mastery in advanced biological engineering didactic training.
- Develop and demonstrate advanced understanding of a research topic in biological engineering.
- For the thesis option, defend research approach and conclusions in an oral examination format.