

MECHANICAL ENGINEERING - DOCTOR OF PHILOSOPHY (PHD)

Mechanical engineering PhD students at CU Boulder take part in cutting edge, tier-one research, learning from nationally and internationally recognized faculty.

Our research harnesses state-of-the-art experimental, theoretical and computational approaches to expand the frontiers of technology, while advancing fundamentals in the underlying disciplines of fluid and solid mechanics, thermal engineering and materials science and engineering.

PhD students choose from focus areas in air quality, biomedical, design, materials, mechanics of materials, micro/nanoscale, robotics and systems design, and thermo fluid sciences.

The PhD program in mechanical engineering is available to students entering graduate studies for the first time as well as those who already have a master's degree. While a master's is not required to enroll, our PhD students will typically earn one on the way to a PhD. The best way to do that is by following an MS thesis curriculum (see the department's Master of Science - Thesis Option (<http://www.colorado.edu/mechanical/prospective-students/graduate/master-science-thesis-option/>) webpage).

PhD students consult with a faculty advisor throughout the duration of their degree to review their research progress and course selection.

For more information, visit the department's PhD (<http://www.colorado.edu/mechanical/prospective-students/graduate/phd/>) webpage.

Requirements

Course Requirements

The PhD requires a minimum of 30 credit hours of coursework in courses numbered 5000 or above, with a minimum GPA of 3.25, plus 30 credit hours of dissertation credit. More coursework may be required at the faculty advisor's discretion.

A maximum of 21 credit hours of graduate coursework may be transferred from another accredited institution. All courses taken for the master's degree at the 5000 level or above at CU Boulder may be applied toward the doctoral degree at the university.

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For more information, visit the department's PhD (<http://www.colorado.edu/mechanical/prospective-students/graduate/phd/>) and Focus Areas (<http://www.colorado.edu/mechanical/research/focus-areas/>) webpages.

Preliminary Examination

Every student desiring to pursue the PhD degree must pass a preliminary examination. As a part of this evaluation, students must pass two oral examinations designed to test research and fundamental mechanical engineering competency. Students must also pass a research presentation given to a committee of at least three faculty members.

Overall performance in the required examinations will determine pass/fail status.

Comprehensive Examination

After passing the preliminary examination, students continue their coursework and prepare a written thesis prospectus. When ready, they take an oral comprehensive examination covering the graduate coursework and the thesis prospectus. The oral examination is based primarily on a written proposal for the thesis research provided by the student to committee members in advance. This examination is conducted before the student's doctoral committee of five or more graduate faculty members chosen by the student and approved by the department and the Graduate School.

PhD Dissertation

Students must write a dissertation based on original research conducted under the supervision of a graduate faculty member. The dissertation must fulfill all Graduate School requirements. After the dissertation is completed, an oral final examination on the dissertation and related topics is conducted by the student's doctoral committee.

Time Limit

All requirements for the mechanical engineering PhD must be completed within six years of the date of commencing coursework.

Learning Outcomes

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

- Demonstrate working knowledge of core theoretical concepts utilized within the discipline of mechanical engineering.
- Demonstrate expertise in background knowledge in the discipline, proficiency with current research methodologies, formulation of well-posed research plans including potential team collaboration, and appreciation of their work's (field's) potential impact on areas such as human health, security, and sustainability.
- Design and conduct high-quality original research.
- Effectively communicate and present disciplinary knowledge and research to academic and public audiences in written, visual, and oral form including peer reviewed journal articles and/or conference proceedings.
- Develop and apply effective engineering pedagogy, and prepare for roles as potential educators and mentors.