

Master of Science in Mechanical Engineering

Master of Science (M.S.) Degree

The Department of Mechanical Engineering offers both a thesis option and a non-thesis (project) option leading to the M.S. degree. Areas of study in Mechanical Engineering include:

1. **Biomechanics and Biomaterials:** biomechanics of human motion, biomaterials, orthopedic biomechanics and biomedical product design, transport phenomena, and drug delivery
2. **Computational Mechanics and Mathematics of Computations:** computational mechanics, finite element analysis, finite element methods and software
3. **Thermal-Fluid Systems and Heat Transfer:** energy and thermal-power system design, heat transfer and computational fluid dynamics
4. **Mechanical Design, Manufacturing, and Mechatronics:** computer-aided mechanical design, continuum mechanics, computer-integrated manufacturing, computational mechanics, finite element analysis, machine stress analysis, Mechatronics, material science, and automatic control systems

Mission

The broad discipline of mechanical engineering enables students to have productive and rewarding careers, and to develop and improve new technologies in both traditional and emerging fields. Mechanical engineers apply fundamental principles to develop, design, manufacture, and test machines and other mechanical devices. Such devices include, but are not limited to power-producing machines, as well as power-consuming machines. Mechanical engineers are employed in diverse areas including, but not limited to the energy and power industries, the automotive and aerospace industries, and industrial manufacturing. Mechanical Engineering graduates also have careers in medicine and medical device development, patent law, engineering and corporate management, forensic engineering, and engineering sales.

The mission of the Mechanical Engineering Department is to provide our students with a high-quality education, to generate and apply knowledge, and to serve both society and the engineering profession.

Graduates holding the M.S. degree in Mechanical Engineering will be able to:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to develop and conduct appropriate physical and/or numerical experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
3. An ability to read, analyze, and critically assess scientific literature.
4. An ability to effectively communicate advanced mechanical engineering concepts in writing and orally at a professional level and an ability to articulate and address critical issues in their field of study.

5. An ability to independently acquire new information, learn new concepts, and build new skills.
6. An ability to recognize ethical and professional responsibilities.

Standard Admission Requirements for all Graduate Programs

- All applicants must meet the requirements outlined in the Admission to Graduate Study (<https://policy.ku.edu/graduate-studies/admission-to-graduate-study/>) policy.
- Bachelor's degree: A copy of official transcripts showing proof of a bachelor's degree (and any post-bachelor's coursework or degrees) from a regionally accredited institution, or a foreign university with equivalent bachelor's degree requirements is required.
- English proficiency: Proof of English proficiency (<https://gradapply.ku.edu/english-requirements/>) for non-native or non-native-like English speakers is required. There are two bands of English proficiency, including Admission and Full proficiency. For applicants to online programs, Full proficiency is required.

Admission Requirements

To qualify for graduate study in any of the graduate programs in the Department of Mechanical Engineering, a student generally must have earned a baccalaureate degree from an accredited mechanical engineering program. However, a student with good preparation in some other engineering discipline or a related program, such as physics, may qualify by taking appropriate undergraduate courses specified by the Mechanical Engineering Department Graduate Admissions Committee . Application information can be found at the graduate admissions (<https://gradapply.ku.edu/apply/>) website.

Minimum English Proficiency Requirements

These guidelines are subject to change by official action of the appropriate Graduate School governance bodies. Visit the full English Proficiency Requirements for Admission to Graduate Study policy (<http://policy.ku.edu/graduate-studies/english-proficiency-international-students/>) for the current requirements.

GTA and GRA Eligibility

Graduate teaching and research assistant eligibility requirements are distinct from admission requirements. Additional information on eligibility for graduate teaching assistants and graduate research assistants may be found in the GTA, GRA, and GA Appointments: General Guidelines and Eligibility (<https://policy.ku.edu/graduate-studies/GRA-GTA-GA-guidelines-eligibility/>).

Contact Information

Please contact the Mechanical Engineering Graduate Program Coordinator at kume@ku.edu or +1 (785) 864-3181, to schedule a visit or with questions about the application process.

**The University of Kansas
Mechanical Engineering Graduate Program
3138 Learned Hall
1530 W. 15th Street
Lawrence, KS 66045**

Master of Science (M.S.) Degree Requirements

The Department of Mechanical Engineering offers both a thesis and a non-thesis option leading to the M.S. degree. Both options require a minimum of 30 credit hours of graduate work. The thesis option must include a thesis for six hours of credit (ME 899) and 24 credit hours of coursework. The non-thesis option must include three-credit hours of independent investigation (ME 860 or ME 899) and 27 credit hours of coursework.

A maximum of 6 hours of mechanical engineering courses numbered between 500 and 699 may be included in the program. Other courses outside of mechanical engineering (besides mathematics) between 500 and 699 require approval by the Graduate Director prior to enrolling. Courses either required or used for the B.S. degree may not be used to fulfill M.S. degree requirements.

Plan of Study

The M.S. degree student selects an advisor in the first semester of graduate study. The student and the student's advisory committee determine a program of study during the first semester of enrollment. The program of study must include (1) a minimum of 12 credit hours in a major selected from Mechanical Engineering courses (excluding credit for mathematics and the independent investigation or thesis) and (2) no fewer than three credit hours dealing with advanced mathematics. The complete plan of study must be approved by the Advisory Committee and the Graduate Director before the beginning of the second semester of graduate enrollment and filed electronically with the Department and the Graduate Division of the School of Engineering. The online Plan of Study can be found at <https://enr.ku.edu/plan-study> (<https://enr.ku.edu/plan-study/>)

Thesis Option

A thesis-option student is expected to do original work that would be the basis of a paper suitable for publication in a refereed journal. After the final oral examination has been passed, and after any changes required by the examination committee have been made in the thesis, the thesis should be submitted electronically in PDF Format to ProQuest/UJI on or before the date specified by the Graduate Studies Office (see <http://graduate.ku.edu/graduation> (<http://graduate.ku.edu/graduation/>) for deadlines). Supplementary materials may be added in formats other than PDF.

Formatting requirements for the thesis are presented here: <http://graduate.ku.edu/etd-formatting-and-working-multimedia-files> (<http://graduate.ku.edu/etd-formatting-and-working-multimedia-files/>).

Non-Thesis Option

A non-thesis option student must do an analytical or experimental study acceptable to the advisory committee. An oral presentation of the results of the independent investigation before Mechanical Engineering graduate students and faculty is required. A typed unbound project report must also be provided to the advisory committee.

Final Examination

Each Masters' degree candidate must pass a final examination that may be oral, or both written and oral, as determined by the advisory committee. The examination must be publicized at least one week before the date of the examination. The examination will cover the field of

Mechanical Engineering for both the thesis and non-thesis options and emphasize the thesis for the thesis option.

The thesis presentation portion of the examination shall be open. The written portion of the examination, if required, will be composed and evaluated by the examination committee. The examination committee, which is normally the advisory committee, must consist of at least three members of the Graduate Faculty and at least two must be Mechanical Engineering Faculty.

For every scheduled examination, the department will report a grade of honors, satisfactory, or unsatisfactory as decided upon by the committee.

The request to schedule the examination must be submitted to the Mechanical Engineering Department at least two weeks prior to the examination date. Unbound or electronic thesis copies are to be submitted to the examination committee two weeks before the examination.

Note: Masters Candidates must be enrolled for at least one credit hour during the semester in which the Masters' final examination is taken, or the semester prior if meeting the early graduation deadline in a given semester.

Only two attempts to pass the Masters' examination are allowed. If the examination is not passed in two attempts, the student will be terminated from the program and will not receive the degree.

Program Time Constraints

University policies on maximum time to degree can be found in the university policy library. (<https://policy.ku.edu/graduate-studies/ma-program-time-constraints/>)

Credit by Transfer

At the discretion of the major department and the Graduate Division, up to nine (9) hours of graduate credit taken at a regionally-accredited graduate school may be transferred and applied to a KU master's degree plan if the credits were taken prior to the final semester of enrollment at KU. Policies guiding transfer credits for a master's degree can be found in the university policy library (<https://policy.ku.edu/graduate-studies/graduate-credit/>).

At the completion of this program, students will be able to:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- Develop and conduct appropriate physical and/or numerical experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Read, analyze, and critically assess scientific literature.
- Effectively communicate advanced mechanical engineering concepts in writing and orally at a professional level and an ability to articulate and address critical issues in their field of study.
- Independently acquire new information, learn new concepts, and build new skills.
- Recognize ethical and professional responsibilities.