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 Microprocessor Applications**: computer-aided mechanical design, continuum mechanics, computer-integrated manufacturing, computational mechanics, finite element analysis, machine stress analysis, microcomputer applications, 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. Conduct original research in mechanical engineering (for the Master of Science with thesis option), or complete a substantial project related to mechanical engineering (for the Master of Science with project option).
2. Demonstrate the ability to learn new concepts and build new skills relevant to the discipline of mechanical engineering.
3. Effectively communicate advanced mechanical engineering concepts, both in writing and orally.
4. Qualified to work at the most prestigious research institutions and universities in the world.

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 Deadlines

Fall Priority Deadline: December 15th
Spring Priority Deadline: September 30th

Applications may be accepted after the priority deadlines listed above, but those applicants may not be considered for fellowships and assistantships. All application materials for international students must be submitted by March 31st for fall and September 30th for spring to be considered for admission. For domestic students, these dates are June 1st for fall and November 1st for spring. See the Graduate Studies website (http://www.graduate.ku.edu/) for the application procedure and fees.

Application Materials

- Online Application (http://graduate.ku.edu/ku-graduate-application/)
- GRE scores (institution code = 6871; program code = 1502)
- One-page statement of purpose
- Resume or curriculum vitae (optional)
- Official transcript from each institution of higher education attended
- Three letters of recommendation
- TOEFL scores (international students; institution code = 6871; program code = 68)
- Financial statement (international students only if admitted)

Submit all supporting documents and your graduate application online (http://graduate.ku.edu/ku-graduate-application/). Graduate Record Examination (GRE) scores are required for all applicants and are used in the evaluation process.

Regular Status

- For admission to regular status in the Master's program, the student must have an undergraduate grade point average (GPA) of at least B (3.0/4.0).

Provisional Status

- For Master’s applicants whose undergraduate GPA is below 3.0/4.0, but no lower than 2.75/4.0, admission on provisional status will be considered on a case-by-case basis.
- After the equivalent of one semester of full-time study as a provisional graduate student, the performance of the student is reviewed and will be (1) transferred to regular status, (2) dropped from the Graduate School, or (3) allowed to continue the equivalent of another semester as a provisional student. It is ordinarily expected that provisional status will not exceed two semesters. Provisional students are not eligible for Graduate Teaching Assistantship (GTA) or Graduate Research Assistantship (GRA) appointments, but may be considered for scholarship/fellowship funding based on need and available funding.
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 at: http://policy.ku.edu/graduate-studies/english-proficiency-international-students (http://policy.ku.edu/graduate-studies/english-proficiency-international-students/).

Admission:

KU recognizes several mechanisms by which applicants may demonstrate their English proficiency. The following are acceptable means of demonstrating English proficiency for purposes of graduate admission:

1. Graduation with a baccalaureate degree (or higher) earned in residence from a regionally accredited English-medium U.S. college or university or from a foreign university which conducts all instruction in English and which maintains substantially equivalent bachelor’s, master’s, or doctoral degree requirements
   • Degrees earned online may not be used to demonstrate English proficiency.
   • Demonstrates Full Proficiency: applicants are not required to complete AEC testing

2. Satisfactory completion of the entire AEC curriculum with a final university designation of "Proficiency Obtained"
   • Demonstrates Full Proficiency: no further English-language testing or coursework is required

3. Employment as an officer in the U.S. military with documentation of selection or promotion to the rank of Major or higher (or the equivalent U.S. Navy or Coast Guard rank)
   • Demonstrates Full Proficiency: applicants are not required to complete AEC testing

4. Official scores from an English proficiency standardized test (e.g. TOEFL, IELTS-Academic, or PTE), sent by the testing agency to the University of Kansas. Official scores must be less than two years old at the time that Graduate Admissions processes the application.
   • Scores demonstrate Provisional, Admission, or Full Proficiency

5. In exceptional cases, a department, with written support from the appropriate school or college, may petition the Vice Provost for Graduate Studies to consider alternative documentation of English proficiency. In consultation with the Executive Council of Graduate Faculty and the Director of the AEC, the Vice Provost for Graduate Studies will determine whether the alternative documentation demonstrates English proficiency at the level expected for regular admission to graduate study at KU.
   • Demonstrates Provisional, Admission, or Full Proficiency, depending on the documentation provided

The Applied English Center (http://aec.ku.edu/) (AEC) maintains a testing process for non-native speakers of English. This process serves to confirm each student’s level of English proficiency and determine whether English courses will be included as a requirement of the student’s academic program. In order to graduate, students who are required to complete AEC courses must meet KU’s Full Proficiency standard as demonstrated by their performance in AEC coursework and/or testing.

• Students who are admitted in the Full Proficiency band are not required to complete AEC testing.
• All other non-native speakers of English who gain admission to campus-based programs are required to complete AEC testing upon arrival on campus.

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 (http://policy.ku.edu/graduate-studies/GRA-GTA-GA-guidelines-eligibility/).

The Board of Regents policy on spoken English competency for graduate teaching assistants requires that non-native speakers of English demonstrate English proficiency by obtaining:

• A minimum score of 50 on the SPEAK or TSE test, or
• A 22 on the speaking portion of the TOEFL (iBT) with Reading, Listening, and Writing part scores of at least 20, or
• An 8 on the speaking portion of the IELTS (minimum overall score of 6.0, no part score below 5.5)

In addition, all non-native speakers of English must be interviewed by three institutional representatives, including at least one student to determine sufficient English proficiency. More information may be found in the Kansas Board of Regents Policy on Spoken English Language Competency of Faculty and Graduate Teaching Assistants (https://policy.ku.edu/KBOR/spoken-english-competency-BOR-policy/). Please consult the Graduate School English Proficiency Score (http://graduate.ku.edu/english-proficiency-requirements/) requirements for admission and GTA/GRA eligibility.

Visiting Us

The graduate program staff is happy to work with all prospective students in evaluating the fit between the student and the program. In order to determine this, we feel that visiting our campus in Lawrence is a very important step. In order to facilitate your visit to KU, there are two main options:

• The first, and most preferred, option entails simply applying for admission to the program. All prospective students are welcome to attend our Open House in early November and some highly qualified admitted students may be invited to participate in Campus Visit Days in late February or early March (prior to the fall semester of your intended matriculation). These organized visitation opportunities will allow you time to gather a great deal of first-hand information which we hope will help you in making a final decision about whether to attend KU.
• The second option is making arrangements to visit us on your own (either in-person or virtual), outside of organized events. With early notification, we will do our best to work with you to provide information and schedule appointments with faculty when possible. Please contact us if you feel that this is the best option for you.

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.

Major

The major will be selected from the energy and thermal-fluids category, the mechanical design category, the computational mechanics category or the biomechanics category. At least half of the graduate level coursework must be taught by graduate faculty employed full-time by the Department of Mechanical Engineering.

Plan of Study

The M.S. degree student selects an adviser 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://gradplan.engr.ku.edu/accounts/login/.

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/UMI on or before the date specified by the Graduate Studies Office (see http://graduate.ku.edu/graduation) for deadlines. Supplementary materials may be added in formats other than PDF.

The student is responsible for submitting any bound copies that may be required by the department and/or advisor. Recommended binding services for personal or departmental copies may be found at http://www.graduate.ku.edu/submitting/. Formatting requirements for the thesis are presented here: 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

Normal expectations are that most master’s degrees (excluding some professional terminal degrees) should be completed in two years of full-time study. However, master’s degree students are allowed seven years for completion of all degree requirements.

In cases in which compelling reasons or circumstances recommend a one-year extension, the Graduate Division, on recommendation of the department/committee, has authority to grant the extension. In cases where more than eight years are requested, the appropriate appeals body of the school considers petitions for further extensions and, where evidence of continuous progress, currency of knowledge, and other reasons are compelling, may grant them.

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. Only work graded B (3.0 on a 4.0 scale) or higher may be transferred. KU does not accept transfer credit for courses that have been graded B- or below. KU also does not accept transfer for institutes, workshops, or for life/ work experience. Credit will not transfer for courses that were previously counted toward the completion of an undergraduate or graduate degree.

A minimum of 15 credits toward a master’s degree must be earned in KU coursework. As described in the M.A. & M.S. Degrees policy, a 30-
hour master’s degree may be reduced to as few as 24 hours for students who are “exceptionally well-prepared.” If coursework is transferred to KU, the same coursework cannot also be utilized to establish a student as “exceptionally well-prepared.” Graduate credit from another institution may not be transferred to a KU graduate certificate program. The department/program and Graduate Division retain the discretion to deny a student’s request to have transfer credit and/or non-degree seeking credit count toward a degree or certificate.