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 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

- 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:**

The following are acceptable means for verifying English proficiency for purposes of admitting international students and domestic non-native English speakers:

- Graduation with a baccalaureate degree (or higher) earned in residence from an accredited English-medium U.S. college or university or a college or university in the United Kingdom, Australia, New Zealand, Ireland, English-speaking province of Canada, or an English-speaking Caribbean country, with instruction conducted in English. Degrees earned online may not be used to verify English proficiency.
- Official scores from an English proficiency standardized test scores (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.
- In exceptional cases, a department, with written support from the appropriate School or College, may petition the Dean of Graduate Studies to consider alternative documentation of English proficiency. In consultation with the Director of the Applied English Center, the Dean of Graduate Studies will determine whether the alternative documentation demonstrates English proficiency at the level expected for regular admission to graduate study at KU.

*International students and students who indicated English as a second language, are required to show proof of English proficiency for admission purposes and must check-in at the Applied English Center (http://www.aec.ku.edu) (AEC) upon arrival on campus for orientation. 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. Note: Students who demonstrate English proficiency at the **waiver level** or who have earned a degree from one of the specified English-speaking countries listed above are not required to check in at the AEC (see eligibility requirements on the Graduate Studies website [https://graduate.ku.edu/english-proficiency-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 (GTA/GRA Eligibility Guidelines [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,
- A 22 on the speaking portion of the TOEFL(BT) 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)

Moreover, the student must be interviewed by three institutional representatives 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://documents.ku.edu/policies/provost/SpokenEnglishLanguageCompetencyBORPolicy.htm](https://documents.ku.edu/policies/provost/SpokenEnglishLanguageCompetencyBORPolicy.htm)). Please consult the Graduate School English Proficiency Score ([http://graduate.ku.edu/english-proficiency-requirements](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. 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 October 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 visit 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 to attend KU.
- The second option is making arrangements to visit us on your own, 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 Program Assistant at kume@ku.edu or (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 66045-7605

**Master of Science (M.S.) Degree Requirements**

The Department of Mechanical Engineering offers both a thesis option 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 at least six hours of credit. The non-thesis option must include at least three-credit hours of independent investigation.

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. A maximum of six hours of Mechanical
Engineering courses numbered between 500 and 699 may be included in the program of study. Courses either required or used for the B.S. degree may not be used to fulfill M.S. degree requirements. 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
The program of study for the thesis option includes the requirements above plus a minimum of six credit hours of thesis.

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 theses, the thesis should be submitted electronically in PDF Format to ProQuest/UMI on or before the date specified by the Graduate Studies Office. Supplementary materials may be added in other formats. (See Section 4, Publication Requirement.) You are responsible for submitting any bound copies that may be required by your department and/or advisor. Recommended binding services for personal or departmental copies may be found at http://wwwgraduate.ku.edu/etd/submitting.

Non-Thesis Option
The program of study for the non-thesis option includes the requirements above plus a minimum of three credit hours of independent investigation.

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.

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.

Note: see the online KU Electronic Thesis and Dissertation Page (http://wwwgraduate.ku.edu/ETD).

Program Time Constraints
Masters' degree students are allowed seven years for completion of all requirements for the degree. 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 or division 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
Six hours of graduate credit taken at a regionally accredited graduate school may be transferred and applied to the Masters' degree, provided that the transfer has the approval of the Department and of the Dean of Engineering. Eight hours may be approved for transfer if the student holds a baccalaureate degree from the University of Kansas. Transfer credit may not be the last hours required for the degree. Only work graded A or B may be transferred. The University of Kansas does not accept the transfer of credit from other institutions for graduate-level courses completed in institutes and workshops or given for life/work experience.

The online Plan of Study can be found at https://gradplan.engr.ku.edu/accounts/login/.

Note: see the online KU Electronic Thesis and Dissertation Page (http://wwwgraduate.ku.edu/ETD).