MECHANICAL ENGINEERING (M.S.)

Program specializations at the master's degree level may be undertaken in many areas, including acoustics, vibrations, machine tool design, biomechanics, combustion engines, controls, composite materials, and fluid and solid mechanics, among others. These program specializations are available to both part-time and full-time students, in either research or non-research degree programs.

Admission Requirements

Applicants must apply online (https://wayne.edu/apply/#graduate) for admission. The applicant must have a bachelor's degree from an ABET accredited institution in the United States or a comparable degree from an officially recognized institution outside the United States to apply for graduate admission. He/she must have adequate preparation and discernible ability to pursue graduate study in the selected major field.

All applicants for the master's program, whose B.S. degree is not from an ABET-accredited university, are required to submit Graduate Record Examination (GRE (http://www.ets.org/gre/)) scores. International applicants are required to submit a WES Evaluation (http://wayne.edu/admissions/graduate/international/) for their transcripts. Note that the official transcript evaluation must be transmitted directly from WES to the Office of Graduate Admissions. Along with the application, the applicant must upload an official transcript from every college and/or university attended. All students who have earned degrees from a country where English is not the native language must have a minimum score of 79 on the internet-based TOEFL (iBT) or 550 from a paper-based TOEFL (pBT) or IELTS score of 6.5.

To be admitted into the Mechanical Engineering graduate programs, an applicant must satisfy all Graduate School requirements (https://wayne.edu/admissions/graduate/admission-requirements/). In addition, a regular admission for Master's degree may be authorized if the applicant's grade point average (g.p.a) is 3.0/4.0 or better and if they hold a degree from an ABET accredited or equivalent institution. Students with an overall g.p.a. between 2.8 and 3.0 out of 4.0 in their B.S.M.E. degree program will be considered on a case-by-case basis.

Students with degrees in fields other than Mechanical Engineering or degrees from non-accredited institutions may be admitted to the post-bachelor program where students will be expected to complete a set of assigned courses with a grade of B or better in each course. The set of assigned courses will be selected from the following list of courses based on the student's field of interest:

Code	Title	Credits
ME 2200	Thermodynamics	3
ME 2410	Statics	3
ME 2420	Elementary Mechanics of Materials	3
ME 3300	Fluid Mechanics: Theory and Laboratory	4
ME 3400	Dynamics	3
ME 4150	Design of Machine Elements	4
ME 4210	Heat Transfer: Theory and Laboratory	4
ME 4300	Thermal Fluid Systems Design	4
ME 4500	Mechanical Engineering Design II	4

A successful completion of all post-bachelor program requirements will earn the student a regular admission to the Master's degree program in Mechanical Engineering.

All applicants must pay the $50 Application Fee. Note that your application will not be assessed until all necessary items are submitted via our online application.

Requirements – Traditional Program

The master's degree in mechanical engineering is offered under the following options:

Plan A (Thesis Option): A minimum of thirty-two credits in course work including an eight-credit thesis.
This program requires a minimum of 32 semester credits that can be selected as follows

- ME 8999 - MS Thesis (8 Cr.)
- A minimum of 8 credits (2 courses) should be taken at the 7000-level. At least 4 credits should be selected from the ME curriculum. Directed study and directed research courses (ME 7990 and ME 7996) cannot be used to satisfy this requirement.
- ME 5000 - Engineering Analysis I (4 Cr.) is a required core course
- A maximum of 8 credits may be taken from other Departments in Engineering (excluding Engineering Technology), Chemistry, Physics or Mathematics Departments
- A maximum of 4 credits may be taken in Directed Studies (ME 5990)
- A minimum of 4 courses (16 Cr.) should be taken from one of the three thrust areas of the ME Department

Plan C (Coursework Option): A minimum of thirty-two credits in course work.
This program requires a minimum of 32 semester credits that can be selected as follows

- A minimum of 12 credits should be taken at the 7000-level. At least 8 credits should be selected from the ME curriculum. Directed study and directed research courses (ME 7990 and ME 7996) cannot be used to satisfy this requirement.
- ME 5000 - Engineering Analysis I (4 Cr.) is a required core course
- A maximum of 8 credits may be taken from other Departments in Engineering (excluding Engineering Technology), Chemistry, Physics or Mathematics Departments
- A maximum of 4 credits may be taken in Directed Studies (ME 5990)
- A minimum of 4 courses (16 Cr.) should be taken from one of the three thrust areas of the ME Department.

Students can choose up to three semesters of internship with the permission of both the ME Graduate Advisor and the Office of International Students and Scholars (OISS). ME 6991 credits must be taken in addition to the minimum 32 credits required for the MSME under either plan A or plan C. The student is responsible for arranging the internship in the industry. Students are eligible to enroll in ME 6991 after successfully completing 16 credits in their graduate program.

Course Group Requirements

The Department of Mechanical Engineering has three research thrust areas, namely the "Noise and Vibration Control", the "Advanced Materials and Manufacturing", and the "Advanced Propulsion and Energy Systems". In addition, many Biomedical Engineering courses are cross listed with ME courses and are available for ME Graduate students to take and be considered towards their degree. Graduate students must select a field of study in one of the three thrust areas of the ME Department.

All MSME students must select at least four courses from one of the three thrust areas listed above. The core course (ME 5000) is considered to be one of the four courses required from the selected thrust area.

Noise and Vibration Control Thrust Area

Courses offered in the ***Noise and Vibration Control*** Thrust area are:

Code	Title	Credits
ME 5115	Fundamentals of Electric-drive Vehicle Modeling	4
ME 5400	Dynamics II	4
ME 5440	Industrial Noise Control	4
ME 5460	Fundamentals in Acoustics and Noise Control	4
ME 5990	Directed Study	1-4
ME 5995	Special Topics in Mechanical Engineering I	1-4
ME 6550	Modeling and Control of Dynamic Systems	4
ME 7315	Electric-drive Vehicle Simulation and Control	4
ME 7400	Advanced Dynamics	4
ME 7440	Signal Processing Technologies and Their Applications	4
ME 7460	Advanced Acoustics and Noise Control	4
ME 7480	Nonlinear Vibration	4
ME 7550	Control of Dynamic Systems	4
ME 7590	Nonlinear Control Systems	4
MAT 8999	Master's Thesis Research and Direction	1-8

Advanced Materials and Manufacturing Thrust Area

Courses offered in the ***Advanced Materials and Manufacturing*** Thrust area are:

Code	Title	Credits
ME 5000	Engineering Analysis I	4
ME 5040	Finite Element Methods I	4
ME 5453	Product and Manufacturing Systems and Processes	4
ME 5580	Computer-Aided Mechanical Design	4
ME 5620	Fracture Mechanics in Engineering Design	4
ME 5720	Mechanics of Composite Materials	4
ME 5990	Directed Study	1-4
ME 5995	Special Topics in Mechanical Engineering I	1-4
ME 7020	Finite Element Methods II	4
ME 7451	Advanced Manufacturing II: Material Forming	4
ME 7680	Manufacturing Processing Mechanics	4
ME 7720	Advanced Mechanics of Composite Materials	4
ME 7820	Engineering Non-Destructive Evaluation (NDE) Methods and Industrial Applications	4
ME 8020	Crashworthiness and Occupant Protection in Transportation Systems I	4
ME 8030	Crashworthiness and Occupant Protection in Transportation Systems II	4
ME 8999	Master's Thesis Research and Direction	1-8

Advanced Propulsion and Energy Systems Thrust Area

Courses offered in the ***Advanced Propulsion and Energy Systems*** Thrust area are:

Code	Title	Credits
ME 5000	Engineering Analysis I	4
ME 5110	Fundamental Fuel Cell Systems	4
ME 5215	Fundamentals of Battery Systems for Electric and Hybrid Vehicles	4
ME 5300	Intermediate Fluid Mechanics	4
ME 5800	Combustion Engines	4
ME 5810	Combustion and Emissions	4
ME 5990	Directed Study	1-4
ME 5995	Special Topics in Mechanical Engineering I	1-4
ME 7260	Heat and Mass Transfer	4
ME 7290	Advanced Combustion and Emissions I	4
ME 7310	Computational Fluid Mechanics and Heat Transfer	4
ME 8290	Advanced Combustion and Emissions II	4
ME 8999	Master's Thesis Research and Direction	1-8

Courses Cross-listed with Biomedical Engineering

Cross-listed courses with ***Biomedical Engineering*** are:

Code	Title	Credits
ME 5100	Quantitative Physiology	4
ME 5160	Musculoskeletal Biomechanics	4
ME 5180	Introduction to Biomaterials	4
ME 7100	Mathematical Modeling in Impact Biomechanics	4
ME 7160	Impact Biomechanics	4
ME 7180	Advanced Topics in Biomaterials and Tissue Biomechanics	4

Student Performance Requirements

- A grade of B or better must be earned for the core course ME 5000 – *Engineering Analysis I*.
- The Graduate GPA will be calculated using all graduate courses taken at Wayne State University. It must always be maintained at 3.0/4.0 or better; otherwise, the student will be placed under academic probation.
- Students on academic probation have one semester to raise their GPA to at least 3.0/4.0. Failure to do so will result in the student being excluded from the ME graduate program.

The overall GPA for completing MSME Degree is 3.0/4.0 or higher (i.e, "B" grade or better) with no more than two courses with grades less than C and no more than two courses can be repeated throughout the MSME program. A passing grade for any course is "B-" or better with the exception of the core course (ME 5000, which must be passed with a grade of "B". Thesis credit requirements are met by satisfactory completion of ME 8999. Note that three "C+" or lower grades will result in termination of the student from the ME graduate program. All course work must be completed in accordance with the regulations of the Graduate School and the College governing graduate scholarship and degrees.

Graduate students may register for a maximum of 8 credits per semester unless they have permission from the ME Director of Graduate Studies.

All course work must be completed in accordance with the regulations of the Graduate School (http://bulletins.wayne.edu/graduate/general-information/academic-regulations/) and the James and Patricia Anderson College of Engineering (http://bulletins.wayne.edu/graduate/college-engineering/academic-regulations/).

M.S. Thesis

The Master's Thesis Committee will consist of three graduate faculty members from the Department of Mechanical Engineering, including the advisor. Upon approval by the ME Director of Graduate Studies, one graduate faculty member of the Department of Mechanical Engineering may be replaced by a member from another department.

The Master's Thesis Committee will administer the final oral examination.

A public final oral examination based on the M.S. thesis is required. The examination will be administered by the advisor and two other graduate faculty members from the Department of Mechanical Engineering. One ME member of the thesis committee may be replaced by a non-ME graduate faculty, if the thesis topic is multi-disciplinary, with the approval of the ME Director of Graduate Studies. Passing of the examination requires a majority vote of the committee.

Time Limitations

Students have a six-year time limit to complete all requirements for the Master's degree. The six-year period starts at the beginning of the semester during which the student has taken work that applies toward meeting the requirements of the degree. The James and Patricia Anderson College of Engineering reserves the right of re-validation of over-age credits. In re-validation cases the advisor and the student must set a terminal date for completion of all degree requirements, including such additional requirements as may be prescribed to re-validate the over-age credits. Time extensions beyond these conditions are authorized only for conditions clearly beyond the student's control.

In work counted toward a Master's degree, no credit may be more than six years old at the time all requirements are completed. A time extension may be authorized by the Associate Dean for Academic Affairs of the James and Patricia Anderson College of Engineering with the approval of the ME Department Chairman, but only for conditions which are clearly beyond the control of the student. Upon recommendation of the advisor and approval of the Associate Dean for Academic Affairs of the James and Patricia Anderson College of Engineering, a student may arrange for re-validation of over-age credits which are between six and ten years old and which represent courses completed at Wayne State University. Credits from other institutions may not be re-validated. A special examination fee is charged for course re-validations.

Graduation

Each degree candidate must file an Application for Degree at the beginning of the semester in which he/she plans to complete degree requirements at https://reg.wayne.edu/students/degrees (https://reg.wayne.edu/students/degrees/). The candidate should consult the academic calendar of the Graduate Division Bulletin. If an application for a degree was filed for a previous semester in which the student did not graduate, a new application is necessary.

Requirements – Online Program

The online Master's of Science in Mechanical Engineering with a concentration in Energy Storage and Vehicle Science provides students with the proper training in emerging fields of energy storage systems, materials, safety and crash-worthiness of battery packs, hybrid powertrain, vehicle dynamics and controls. The online MSME requires the completion of a minimum of 32 credits (equivalent to eight courses) under master's Plan C: Coursework. The proposed curriculum has one core course (ME 5000, 4 cr.) and six required courses (24 credits). Students have to select one course from a suggested set of five courses (4 cr.). All coursework must be completed in accordance with the regulations of the Graduate School (http://bulletins.wayne.edu/graduate/general-information/academic-regulations/) and the James and Patricia College of Engineering (http://bulletins.wayne.edu/graduate/college-engineering/academic-regulations/).