## M.S. IN MECHANICAL ENGINEERING

### **OVERVIEW**

The field of mechanical engineering is very diverse, offering opportunities in research, design, product development and manufacturing. Major areas of mechanical engineering include aerodynamics, fluid dynamics, solid mechanics, bioengineering, material sciences, nanotechnology, dynamics, automotive engineering, production and process, machine design, vibrations and control systems, and reliability-based design and optimization. The department features state-of-the-art studies using modern equipment and techniques.

### **ADMISSIONS REQUIREMENTS**

Applicants must hold a B.S. in mechanical or industrial engineering, or a closely related field, from an accredited engineering program. If the baccalaureate is in a non-engineering or science area, students may be required to complete prerequisite courses without graduate degree credit. For transfer credit, students should refer to the general policies of the College of Graduate Studies.

Application requirements:

- **Degree:** Applicants must hold a four-year bachelor's degree from a regionally accredited college or university
- **GPA:** Applicants must have at least a 3.0/4.0 grade point average from previous undergraduate coursework or a 3.3/4.0 for previous graduate coursework
- Application: UToledo application required
- GRE: Not required
- Transcripts: Required
- · Statement of Purpose: Required
- · Letters of Recommendation: 2 minimum; 3 preferred
- **Proof of English language proficiency:** Required for students from non-English speaking countries. See University graduate admissions for minimum test score requirements and exceptions.

Application priority deadlines for admissions and funding decisions:

- Fall: March 15
- Spring: October 1
- Summer: Contact department

### **PROGRAM REQUIREMENTS**

The Master of Science degree program may be pursued with thesis, project and non-thesis options.

The MS in Mechanical Engineering degree can be completed in one of two research focus areas. Degree requirements for thesis, project, and coursework-only capstone options are provided in the tables below. The department may specify additional credit or non-credit requirements for satisfactory completion as well as enhancement of degree objectives. The plan of study for the Master of Science degree must be filed before 16 hour of academic coursework has been completed. For full-time students, this normally will require that the plan of study be filed before registration for the second term.

A minimum of 12 cr hr of required or elective coursework must be 6000level. A student may be required to complete more than the required minimum cr hr to satisfy prerequisite deficiencies specified as provisional admission conditions and/or to fulfill educational requirements for the program as specified by the advisor or department.

# Materials, Design, and Manufacturing research focus area:

Code	Title	Hours
Mathematics cor	e	3
MIME 6000	Advanced Engineering Mathematics I	3
or other gradu	ate level math course with prior advisor approval	
Focus area core (2 courses)		
MIME 5060	Manufacturing Engineering	3
MIME 5300	Advanced Mechanics Of Materials	3
MIME 6200	Advanced Dynamics	3
MIME 6720	Design of Experiments	3
Elective coursew	ork - cr hr requirement depends on capstone optic	n12-21
MIME 5060	Manufacturing Engineering	3
MIME 5080	Operations Research I	3
MIME 5100	Manufacturing Systems Simulation	3
MIME 5230	Dynamics Of Human Movement	3
MIME 5240	Experimental Methods in Orthopaedic Biomechanics	3
MIME 5280	Cad - Finite Element Methods	3
MIME 5300	Advanced Mechanics Of Materials	3
MIME 5310	Mechanics Of Composite Materials	3
MIME 5430	Advanced Automotive Control Systems	3
MIME 5440	Advanced Mechatronics	3
MIME 5450	Advanced Automation Design	3
MIME 5460	Advanced MATLAB for Engineers	3
MIME 5800		3
MIME 5820	Sustainability Analysis and Design	3
MIME 5830	Additive Manufacturing	3
MIME 6300	Continuum Mechanics	3
MIME 6200	Advanced Dynamics	3
CIVE 6340		3
MIME 6350	Elasticity	3
MIME 6360	Plasticity	3
MIME 6380	Fracture Mechanics	3
MIME 6650	Advanced Material Science and Engineering	3
MIME 6720	Design of Experiments	3



MIME 6800		3		
MIME 6810	Assembly And Joining Processes	3		
or other gradu approval	ate level engineering course with prior advisor			
Capstone option		21		
MS thesis				
MIME 6960	Graduate Research and Thesis	9		
Elective coursework		12		
MIME 6930	Graduate Seminar (every semester)	0		
MS Project				
MIME 6920	Special Projects	6		
Elective coursework		15		
MIME 6930	Graduate Seminar (every semester)	0		
Coursework only				
Elective coursework		21		
MIME 6930	Graduate Seminar (every semester)	0		

#### **COmputational & Experimental Thermal Sciences RESEARCH FOCUS AREA:**

Code	Title	Hours	
Mathematics core			
MIME 6000	Advanced Engineering Mathematics I	3	
or other gradua	ate level math course with prior advisor approval		
Focus area core		9	
MIME 6460	Intermediate Fluid Mechanics and Heat Transfer	r 3	
Select 1 of the following courses:			
MIME 6440	Computational Fluid Dynamics I	3	
MIME 6450	Experimental Fluid Mechanics	3	
MIME 6470	Advanced Computational Fluid Dynamics	3	
Select 1 of the	following courses:		
MIME 6570	Advanced Fluid Mechanics	3	
MIME 6580	Advanced Heat Transfer	3	
Elective coursewo	ork - cr hr requirement depends on capstone optic	on 9-18	
MIME 5410	Alternative Energy	3	
MIME 5510	Turbomachinery	3	
MIME 5520	Heating, Ventilating & Air Conditioning	3	
MIME 5530	Internal Combustion Engines	3	
MIME 5540	Jet Propulsion	3	
MIME 5550	Aerodynamics	3	
MIME 5560	Gas Dynamics	3	
MIME 6440	Computational Fluid Dynamics I	3	
MIME 6450	Experimental Fluid Mechanics	3	
MIME 6460	Intermediate Fluid Mechanics and Heat Transfer	r 3	
MIME 6470	Advanced Computational Fluid Dynamics	3	
MIME 6540	Computational Fluid Dynamics II	3	
MIME 6570	Advanced Fluid Mechanics	3	
MIME 6580	Advanced Heat Transfer	3	
or other gradua approval	ate level engineering course with prior advisor		

Capstone option		18
MS thesis		
MIME 6960	Graduate Research and Thesis	9
Elective coursew	ork	9
MIME 6930	Graduate Seminar (every semester)	0
MS Project		
MIME 6920	Special Projects	6
Elective coursew	12	
MIME 6930	Graduate Seminar (every semester)	0
Coursework on	ly	
Elective coursework		
MIME 6930	Graduate Seminar (every semester)	0

- · PLO 1. Demonstrate technical proficiency in their focus area topics
- PLO 2. Apply advanced engineering mathematics and/or statistical principles to solve engineering problems in one of the ME specialty areas
- PLO 3. Demonstrate ability to conduct a literature review
- PLO 4. Explain course projects in one of the ME specialty areas clearly and concisely in written and oral formats
- PLO 5. Thesis or project option: explain their research clearly and concisely in written and oral formats
- PLO 6. Thesis or project option: generate high quality engineering research

