

# Mechatronic Systems Engineering

MASTER OF SCIENCE IN

Mechatronic systems engineers use precision mechanical, electrical, and computer engineering, as well as math and computer science, to design the enhanced products, systems, and manufacturing processes demanded by today's marketplace. Using advanced scientific and engineering knowledge, mechatronic systems engineers combine mechanical, electric, and electronic subsystems to create single controllable systems.



The automobile today contains over 100 computers – and is just one of the many modern machines, from clothes dryers and dishwashers to auto-focus cameras and ATMs, that relies on mechatronic systems. Mechatronic systems engineers also play an indispensable role in industrial robotics and the development of autonomous (unmanned) vehicles, which can function as everything from space probes to mobile military reconnaissance units.

## Why Mechatronic Systems Engineering at Lawrence Tech?

Lawrence Technological University's Master of Science in Mechatronic Systems Engineering is one of just a few graduate programs in the United States, and provides the advanced skills students need to succeed in the rapidly changing world of engineering. Whether you are just beginning your career or are an experienced practicing professional, the mechatronic systems engineering program at Lawrence Tech can prepare you for an excit-

ing future in a variety of technical and research fields.

Designed for busy students, all classes are conveniently scheduled in the evenings. In keeping with the University's motto of theory and practice, you will participate in real-world projects throughout your studies. A new Mechatronic Systems Laboratory, equipped with high-tech sensors and actuators, hydraulic and pneumatic test stands with different types of controllers, and computer software, as well as the unique 4 x 4 vehicle chassis dynamometer, exposes you to the theory and principles of mechatronic systems engineering through hands-on applications and professional advanced training for industry. You will have the opportunity to participate in international research collaboration efforts with universities and professional societies, as well as applied research projects with industry and research organizations.

The program's curriculum is particularly strong in areas that form the basis of mechatronics, including analytical and adaptive

## CURRICULUM

Your 30-credit-hour program consists of:

Core Courses	24
Analytical and Adaptive Dynamics in Mechatronic Systems	
Mechanical Design of Mechatronic Systems/Robots	
Modern Control in Mechatronic Systems	
Adaptive Control in Mechatronic Systems	
Optimization in Mechatronic Systems	
Intelligent Control	
Mechatronic Systems Implementation I and II	
Electives or Thesis	6
<i>Examples of elective courses include:</i>	
Autonomous Wheel Power Management Systems	
Special Topics in Inverse Dynamics	
Intelligent Tire and Vehicle Structure	
Mechatronics	
Digital Control Systems	
Intelligent Systems	
<b>Total</b>	<b>30</b>

“The mechatronics systems engineering program at Lawrence Technological University has been an outstanding experience. The entire program focuses on the synergy among mechanical, electrical, and computer engineering. The balance between classroom theory and real-world experience has been conveyed through professors from the industry, guest lecturers, and plenty of lab time. This program is very thought out, and well worth the investment.”

Eric Brines, mechatronics systems engineering student and project engineer, Lear Corporation

dynamics, math modeling and optimization, mechanical design of mechatronic systems and their adaptive and intelligent control, and robotics design and control. Building on these strengths, the MS in Mechatronic Systems Engineering emphasizes **autonomous and conventional vehicle mechatronic systems engineering and industrial robotics engineering** – providing a skill set much in demand.

Lawrence Tech’s MS in Mechatronic Systems Engineering consists of 30 credit hours – eight core courses and two elective courses or a thesis – covering all aspects of the synergistic design of mechatronic systems.

### Industry Advisory Board

The Mechatronic Systems Engineering Industry Advisory Board is composed of engineers, executives, and other working professionals who provide input on the needs of industry; advise on curricular, course, and laboratory development; recommend potential research topics; and assist in program assessment. Current board members represent:

Aisin World Corp. of America  
Chrysler LLC  
Daimler AG  
dSPACE, Inc.  
Eaton Corp.

Festo Corp.  
Ford Motor Co.  
General Motors Corp.  
Johnson Controls, Inc.  
Kistler Instrument Corp.  
KUKA Robotics Corp.  
MSC Software Corp.  
National Instruments Corp.  
Opal-RT Technologies Inc.  
Robert Bosch Corp.  
Robotic Industries Assoc.  
The MathWorks, Inc.  
Toyota Technical Center, U.S.A., Inc.  
U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC)  
Vector CANtech, Inc.

### Getting Started

Admission to Lawrence Tech’s MS in Mechatronic Systems Engineering program is competitive. Applicants must:

- Hold a Bachelor of Science degree in Mechanical, Electrical, or Computer Engineering, or an equivalent degree from an ABET-accredited college or university. Individuals with a Bachelor of Science in Mathematics or Computer Science, or an equivalent degree from an accredited college or university, and three to five years of

- experience working in mechatronic systems engineering, also may apply.
- Have a minimum undergraduate overall GPA of 3.0.
- Provide three letters of recommendation, including one from a corporate supervisor (candidates who completed their undergraduate program within the last three years should submit a letter from a professor in their major field).
- Provide official transcripts of all completed college work.

- Submit a completed graduate application form.
- For more information, contact Lawrence Tech’s Office of Admissions at 800.CALL.LTU or [admissions@ltu.edu](mailto:admissions@ltu.edu). For specific questions about the Master of Science in Mechatronic Systems Engineering program, call 248.204.2577 or visit [ltu.edu/engineering/mechanical/mechatronics.asp](http://ltu.edu/engineering/mechanical/mechatronics.asp).

### GET MORE. DO MORE.

Lawrence Technological University produces leaders with an entrepreneurial spirit and a global view. That’s why Lawrence Tech graduates are known for top job placement and higher starting salaries. Your benefits:

- Intensive leadership-driven programs that embrace theory and practice
- Faculty with current industry experience, not just book smarts
- Convenient schedules that include day, evening, weekend, and online classes
- Well-connected career placement services
- A hi-tech, wireless 102-acre campus that’s commuter friendly, with recreation, housing, and meal service options

Explore over 80 undergraduate, master’s, and doctoral programs in Colleges of Architecture and Design, Arts and Sciences, Engineering, and Management.