Proposed Mechatronic Concentration
Dept. of Mechanical & Industrial Eng.

Contact Faculty
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Brief Introduction to Mechatronics

- The name *Mechatronics* stems from *Mechanical* and *Electronics*. It is a multidisciplinary approach to product design and development, merging the principles of electrical, mechanical, computer, material, chemical and industrial engineering.

- Mechatronic systems are typically composed of traditional mechanical and electrical components, but are referred to as "intelligent" devices due to the incorporation of sensors, actuators, and computer control systems.

- Mechatronics can be viewed as “a modern engineering process” that deals with the design and manufacture of intelligent products or systems involving hybrid mechanical and electronic functions.”
Need for Mechatronics Concentration

- Our primary objective is to better streamline and manage the increasing demands in “Mechatronic Systems” focus area within MIE MS/PhD graduate students applicants.
- This will create a better environment to educate the next generation of engineers in intelligent and integrated systems and machines along with their practical applications.
- This concentration has the potential to create a workforce of engineers and scientists trained in mechatronic systems, with applications ranging from intelligent products and manufacturing processes to biological systems.
Concentration Course Requirements

- The proposed concentration in Mechatronics consists of a typical 32 credit hours of pre-core, core and elective courses, as well as a possible thesis option.

- It is envisioned to cover the following four competency areas within this concentration:
  - Mathematics Competency
  - Mechanics Competency
  - Mechatronics Competency
  - Electrical Engineering Competency
Concentration Course Requirements

- **Mathematics Competency Courses**
  - ME 6200 Mathematical Methods for Mechanical Engineers 1
  - ME 6201 Mathematical Methods for Mechanical Engineers 2
  - ME 5657 Finite Element Method

- **Mechanics Competency Courses**
  - ME 5655 Dynamics & Mechanical Vibration
  - ME 5XXA Linear and Nonlinear Dynamics of Mechatronics Systems (New)
Concentration Course Requirements [Cont.]

- Mechatronics Competency Courses
  - ME 5659 Control and Mechatronics
  - ME 5XXB Mechatronic Systems (New)
  - CSYE 5250 Robot Mechanics and Control
  - ME 5XXC Sensors/Actuators Dynamics and Control (New)

- Electrical Engineering Competency Courses
  - EECE 5610 Digital Control Systems
  - EECE 5666 Digital Signal Processing
Elective Courses
- ME 6260 Introduction to Microelectromechanical Systems (MEMS)
- EECE 5606 Micro and Nanofabrication
- CSYE 7260 Manufacturing Methods and Techniques
- ME 7374 Advanced Control Engineering
- ME 7315 Heat Transfer Processes in Microelectronic Devices
- Or other graduate engineering or science courses (by petition).
Concentration Course Requirements (MSME Course-Only Track)

- 1 course from Mathematics Competency or petition not to take it if already taken [4 or 0]
- 1 course from Mechanics Competency or petition not to take it if already taken [4 or 0]
- 3 courses from Mechatronics Competency or petition to take only 2 [12 or 8]
- 1 course from Electrical Engineering Competency [4]
- 2 or 3 or 4 or 5 courses (depending on the petitions above) from Elective Courses [8 or 12 or 16 or 20]

**Total: 32 SH**
Concentration Course Requirements

(MSME Course-Project Track)

- 1 course from Mathematics Competency or petition not to take it if already taken [4 or 0]
- 1 course from Mechanics Competency or petition not to take it if already taken [4 or 0]
- 3 courses from Mechatronics Competency or petition to take only 2 [12 or 8]
- 1 course from Electrical Engineering Competency [4]
- 1 or 2 or 3 or 4 courses (depending on the petitions above) from Elective Courses [4 or 8 or 12 or 16]
- 1 Independent (project) course or hands-on industrial-sponsored project [4]

**Total: 32 SH**
Concentration Course Requirements (MSME Course-Thesis Track)

- 1 course from Mathematics Competency or petition not to take it if already taken [4 or 0]
- 1 course from Mechanics Competency or petition not to take it if already taken [4 or 0]
- 3 courses from Mechatronics Competency or petition to take only 2 [12 or 8]
- 1 course from Electrical Engineering Competency [4]
- 0 or 1 or 2 or 3 courses (depending on the petitions above) from Elective Courses [0 or 4 or 8 or 12]
- Thesis [8]
- **Total: 32 SH**