

Mechatronics Technical Elective Groupings

One of the primary advantages of Mechatronics Engineering is its wide range of usefulness and application. Within the many field of Mechatronics, it is often advantageous to develop one's specific skills within a certain aspect of the discipline; allowing for a more efficient and focused study.

Below are five specific groupings, accompanied by recommended courses that would further one's education in those fields.

Electrical & Mechanical Hardware Systems Design

A key aspect of Mechatronics is the development of robust mechanical-electrical systems. This field of study drives the innovations capable not only in Mechatronics, but in other disciplines as well. These technical electives introduce the student to tools that are driving today's industry.

<i>4A Courses</i>	<i>4B Courses</i>
ECE 463: Design and Applications of Power Electronic Converters	ECE 327: Digital Hardware Systems
ECE 493: Mechatronics Integration	ME 524: Advanced Dynamics & Vibrations
ME 362: Fluids Mechanics 2	ME 555: Computer-Aided Design
ME 559: Finite Element Methods	ME 563: Turbomachines
ME 561: Fluid Power Controls	ME 564: Aerodynamics
MTE 545: Introduction to MEMS Fabrication	MTE 420: Power Electronics and Motor Drives
	SYDE 348: User Centred Design Methods
	SYDE 542: Advanced Interface Design

Intelligent Software Systems

Behind many state of the art, Mechatronic Machines, lies an intelligent software system driving it. Many processes are only possible by abstracting complex problems into sub-problems and addressing the systems as a whole. The technical electives presented below introduce the student to higher level concepts that are used in larger more complex software systems.

<i>4A Course</i>	<i>4B Courses</i>
CS 446: Software Design and Architectures	CS 456: Computer Networks
SYDE 531: Design Optimization Under Probablistic Uncertainty	ECE 457B: Fundamentals of Computational Intelligence
SYDE 533: Conflict Resolution	SYDE 522: Machine Intelligence
	ECE 455: Embedded Software

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Industrial Process Automation

One of the primary motivations to study Mechatronics systems lies in the field of automation. The largest customer for these types of products is the manufacturing and production industry. Thus, to prepare the student to meet this large market, the following technical electives allow the student to learn the core courses to meet this demand.

<i>4A Courses</i>	<i>4B Courses</i>
ECE 463: Design & Applications of Power Electronic Converters	ME 547: Robotic Manipulators: Kinematics, Dynamics, Control
ECE 493: Mechatronics Integration	ME 555: Computer-Aided Design
ME 548: Numerical Control of Machine Tools 1	
ME 559: Finite Element Methods	
ME 561: Fluid Power Control Systems	
SYDE 531: Design Opt Prob Uncertainty	

Systems, Sensing & Control

A mechatronic system is only as good as the parts that make up the whole. Many of the complex problems solved by Mechatronics are only possible by having accurate and precise control of its sensors and subcomponents. These technical electives prepare the student by exposing them to robust techniques to design robust systems.

<i>4A Courses</i>	<i>4B Courses</i>
MTE 544: Autonomous Mobile Robotics	ECE 457B: Fundamentals of Computational Intelligence
SYDE 575: Image Processing	ECE 488: Multivariable Control Systems
	MTE 420: Power Electronics & Motor Drives
	SYDE 372: Introduction to Pattern Recognition
	SYDE 522: Machine Intelligence

Biomedical Applications

The need for advanced technologies to address the medical needs of the world's people is growing. To meet these needs the following technical electives are presented to enrich the student with the tools needed to achieve success.

Note: These technical electives provide useful alternatives for students pursuing a Biomechanics option

<i>4A Courses</i>	<i>4B Courses</i>
ME 559: Finite Element Methods	SYDE 384: Biological and Human Systems
MTE 545: Introduction to MEMS Fabrication	SYDE 544: Biomedical Measurement & Signal Processing
SYDE 543: Cognitive Ergonomics	SYDE 556: Simulating Neurobiological Systems
SYDE 575: Image Processing	