# Mechatronics Engineering Technology, B.S.

Visit the Technology Management and Mechatronics Department page (https://www.uvu.edu/tm/) for more information on the program and access to advising.

## Program Description

The Mechatronics Engineering Technology Degree from Utah Valley University prepares graduates to work in the Utah manufacturing sector as an automation technologist, design technician, PLC programmer, as well as many other aspects of implementing manufacturing systems. Students complete courses in PLC programming and architecture, materials, CAD, electrical and mechanical components, pneumatics, and motor control. Students will also take courses in technical writing, physics, chemistry, and business to round out their professional profile.

## Matriculation Requirements

Graduates of the Mechatronics Engineering Technology, Electrical Automation Robotic Technology (E.A.R.T) or Automation and Electrical Technology (A.E.T) A.A.S. degree programs at UVU may automatically matriculate into the Bachelor of Science degree program in Mechatronics Engineering Technology.

E.A.R.T and A.E.T graduates that have not taken college algebra (MATH 1050) should enroll prior to or during their first semester in which they are enrolled in the Mechatronics B.S. program.

## Program Requirements

| Code | Title | Credit Hours |
|---|---|---|
| **Total Credit Hours** | | **120** |
| **General Education Requirements** | | **31 Credits** |
| ENGL 1010 | Introduction to Academic Writing | 3 |
| or ENGH 1005 | Literacies and Composition Across Contexts | |
| ENGL 2010 | Intermediate Academic Writing | 3 |
| MATH 1050 | College Algebra | 4 |
| or MATH 1055 | College Algebra with Preliminaries | |
| Complete one of the following: | | 3 |
| HIST 2700 & HIST 2710 | US History to 1877 and US History since 1877 (6) | |
| HIST 1700 | American History (3) | |
| HIST 1740 | US Economic History (3) (recommended) | |
| POLS 1000 | American Heritage (3) | |
| POLS 1100 | American National Government (3) | |
| Distribution Courses: | | |
| Biology (BIOL 1010 Recommended) | | 3 |
| Physical Science (PHYS 1010 Recommended) | | 3 |
| Humanities (ENGL 2100 Recommended) | | 3 |
| Personal, Professional, and Civic Growth | | 3 |
| Social/Behavioral Science | | 3 |
| Fine Arts | | 3 |
| **Discipline Core Requirements** | | **89 Credits** |
| PHYS 2010 & PHYS 2015 | College Physics I and College Physics I Lab | 5 |
| EGDT 1071 | 3 Dimensional Modeling--Solidworks | 3 |
| MECH 1010 | Fundamentals of Mechatronics | 3 |
| MECH 1200 | Electronics in Automation Design | 3 |
| MECH 1205 | Electronics in Automation Design Laboratory | 2 |
| MECH 2200 | Semiconductors in Mechatronic Systems | 3 |
| MECH 1300 | Industrial Wiring for Mechatronic Systems | 1 |

| | | |
|---|---|---|
| MECH 1305 | Industrial Wiring for Mechatronic Systems Laboratory | 2 |
| MECH 2205 | Semiconductors in Mechatronic Systems Lab | 1 |
| MECH 2300 | Microcontroller Architecture and Programming | 3 |
| MECH 2305 | Microcontroller Architecture and Programming Lab | 2 |
| MECH 2400 | Mechanical Components | 4 |
| MECH 2500 | Introduction to PLCs in Mechatronic Design | 2 |
| MECH 2505 | Introduction to PLCs in Mechatronic Design Laboratory | 2 |
| MECH 2510 | Fundamentals of Automation Controls | 2 |
| MECH 2515 | Fundamentals of Automation Controls Laboratory | 1 |
| MECH 2550 | Advanced PLC Programming and Applications | 2 |
| MECH 2555 | Advanced PLC Programming and Applications Laboratory | 2 |
| MECH 2600 | Introduction to Fluid Power Systems | 2 |
| MECH 2605 | Introduction to Fluid Power Systems Laboratory | 1 |
| MECH 2700 | Industrial Motor Control Mechatronic Systems | 2 |
| MECH 2705 | Industrial Motor Control Mechatronic Systems Laboratory | 2 |
| MECH 3220 | Motion Control for Mechatronic Systems | 3 |
| MECH 3225 | Motion Control for Mechatronic Systems Laboratory | 1 |
| MECH 3300 | Industrial Networks | 2 |
| MECH 3305 | Industrial Networks Laboratory | 1 |
| MECH 3400 | Statics and Material Properties for Mechatronics | 4 |
| MECH 3405 | Statics and Material Properties for Mechatronics Laboratory | 1 |
| MECH 3500 | Industrial Robots | 2 |
| MECH 3505 | Industrial Robots Laboratory | 1 |
| MECH 3570 | Design Analysis and Rapid Prototyping | 3 |
| MECH 3700 | CNC Machines in Mechatronic Design | 2 |
| MECH 3705 | CNC Machines in Mechatronic Design Laboratory | 1 |
| MECH 4300 | Capstone I | 2 |
| MECH 4305 | Capstone I Laboratory | 1 |
| MECH 4400 | Polymers/Composites and Processes | 3 |
| MECH 4500 | Advanced Automation Controls | 3 |
| MECH 4505 | Advanced Automation Controls Laboratory | 1 |
| MECH 4800 | Capstone II | 3 |
| Elective Requirements | | 5 |
| MECH 4810R | Mechatronics Internship (3) | |
| MECH 4900R | Topics in Mechatronics (3) | |
| TECH 3010R | Technology Lecture Series (1) | |

## Graduation Requirements

1. Completion of 120 or more credit hours.
2. Overall grade point average of 2.0 (C) or above, with no core course below a C-.
3. Residency hours: minimum of 30 credit hours through course attendance at UVU.
4. Successful completion of at least one Global/Intercultural course.
5. Successful completion of at least two Writing Enriched courses.

## Graduation Plan

This graduation plan is a sample plan and is intended to be a guide. Your specific plan may differ based on your Math and English placement and/or transfer credits applied. You are encouraged to meet with an advisor and set up an individualized graduation plan in Wolverine Track (http://www.uvu.edu/wolverinetrack/).

| **First Year** | | |
|---|---|---|
| **Semester 1** | | **Credit Hours** |
| ENGL 1010 | Introduction to Academic Writing | 3 |
| or ENGH 1005 | or Literacies and Composition Across Contexts | |

| | | |
|---|---|---|
| MATH 1050<br>or MATH 1055 | College Algebra<br>or College Algebra with Preliminaries | 4 |
| MECH 1010 | Fundamentals of Mechatronics | 3 |
| MECH 1200 | Electronics in Automation Design | 3 |
| MECH 1205 | Electronics in Automation Design Laboratory | 2 |
| | **Credit Hours** | **15** |
| **Semester 2** | | |
| EGDT 1071 | 3 Dimensional Modeling--Solidworks | 3 |
| MECH 1300 | Industrial Wiring for Mechatronic Systems | 1 |
| MECH 1305 | Industrial Wiring for Mechatronic Systems Laboratory | 2 |
| MECH 2200 | Semiconductors in Mechatronic Systems | 3 |
| MECH 2205 | Semiconductors in Mechatronic Systems Lab | 1 |
| MECH 2300 | Microcontroller Architecture and Programming | 3 |
| MECH 2305 | Microcontroller Architecture and Programming Lab | 2 |
| | **Credit Hours** | **15** |
| **Second Year** | | |
| **Semester 3** | | |
| PHYS 2010<br>& PHYS 2015 | College Physics I<br>and College Physics I Lab | 5 |
| Social/Behavioral Science (ECON 1010 Recommended) | | 3 |
| MECH 2400 | Mechanical Components | 4 |
| MECH 2500 | Introduction to PLCs in Mechatronic Design | 2 |
| MECH 2505 | Introduction to PLCs in Mechatronic Design Laboratory | 2 |
| MECH 2510 | Fundamentals of Automation Controls | 2 |
| MECH 2515 | Fundamentals of Automation Controls Laboratory | 1 |
| | **Credit Hours** | **19** |
| **Semester 4** | | |
| Humanities (ENGL 2100 Recommended) | | 3 |
| Physical Science (PHYS 1010 Recommended) | | 3 |
| MECH 2550 | Advanced PLC Programming and Applications | 2 |
| MECH 2555 | Advanced PLC Programming and Applications Laboratory | 2 |
| MECH 2600 | Introduction to Fluid Power Systems | 2 |
| MECH 2605 | Introduction to Fluid Power Systems Laboratory | 1 |
| MECH 2700 | Industrial Motor Control Mechatronic Systems | 2 |
| MECH 2705 | Industrial Motor Control Mechatronic Systems Laboratory | 2 |
| | **Credit Hours** | **17** |
| **Third Year** | | |
| **Semester 5** | | |
| ENGL 2010 | Intermediate Academic Writing | 3 |
| Fine Arts | | 3 |
| Personal, Professional, and Civic Growth | | 3 |
| MECH 3220 | Motion Control for Mechatronic Systems | 3 |
| MECH 3225 | Motion Control for Mechatronic Systems Laboratory | 1 |
| MECH 3500 | Industrial Robots | 2 |
| MECH 3505 | Industrial Robots Laboratory | 1 |
| | **Credit Hours** | **16** |
| **Semester 6** | | |
| Biology (BIOL 1010 Recommended) | | 3 |
| MECH 3300 | Industrial Networks | 2 |
| MECH 3305 | Industrial Networks Laboratory | 1 |
| MECH 3400 | Statics and Material Properties for Mechatronics | 4 |
| MECH 3405 | Statics and Material Properties for Mechatronics Laboratory | 1 |
| MECH Elective | | 3 |
| | **Credit Hours** | **14** |
| **Fourth Year** | | |
| **Semester 7** | | |
| American Institutions | | 3 |
| MECH 3570 | Design Analysis and Rapid Prototyping | 3 |
| MECH 3700 | CNC Machines in Mechatronic Design | 2 |
| MECH 3705 | CNC Machines in Mechatronic Design Laboratory | 1 |
| MECH 4300 | Capstone I | 2 |
| MECH 4305 | Capstone I Laboratory | 1 |

| | | |
|---|---|---|
| MECH Elective | | 2 |
| | **Credit Hours** | **14** |
| **Semester 8** | | |
| MECH 4400 | Polymers/Composites and Processes | 3 |
| MECH 4500 | Advanced Automation Controls | 3 |
| MECH 4505 | Advanced Automation Controls Laboratory | 1 |
| MECH 4800 | Capstone II | 3 |
| | **Credit Hours** | **10** |
| | **Total Credit Hours** | **120** |

# Program Learning Outcomes

1. Demonstrate proficiency in basic automation technology subjectsincluding: (a) electronic mathematics, (b) AC and DC circuits andcomponents, (c) computer architecture(d) programmable logic controllers(PLC's), (d) industrial pneumatic and hydraulic systems, and (e) CAD based mechanical design.
2. Demonstrate appropriate technical reading, writing, and communications skills.
3. Demonstrate proficiency in mathematics appropriate for automation technology.
4. Demonstrate proficiency in design, analysis, operation, and troubleshooting of automation systems, including: (a) automation motors (servo, stepper, PMDC, and BLDC), (b) industrial pneumatics (actuators,valvesetc.), (c) PID speed and position controls, and (d) kinematics/dynamics of machines (motion analysis, linkages, and mechanisms).
5. Master PLC programming, operation, and structure for automation systems.

## Electrical and electronic engineering technologists and technicians

- Total Positions99,600
- Field Growth3.0%
- Median Salary$72,800
- Average Openings9.5

## Electro-mechanical and mechatronics technologists and technicians

- Total Positions15,800
- Field Growth-1.2%
- Median Salary$65,080
- Average Openings1.3