

Fall 2016

# Mechatronics

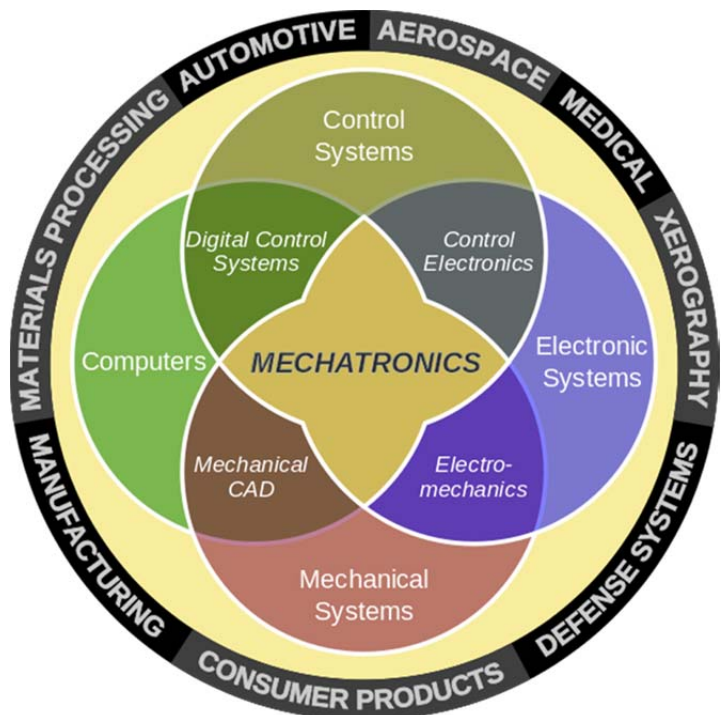
Mechatronics is the synergistic integration of mechanics, electronics, control and systems theory and computers into a complex, single system used within production and manufacturing, in order to improve and/or optimize its efficiency, productivity, and quality.



## What is Mechatronics?

With its system focus and holistic learning model Mechatronics training addresses the skills gap concerns that industry is experiencing today by focusing on relevant skills training. Mechatronics training is the starting point for all trainees, maintenance staff, incumbent workforce and new production hires. Mechatronics training involves e-Learning with appropriate, hands-on learning of theoretical principles.

*“I did not know anything about electricity so I am glad that I had the opportunity to take AC/DC Electrical Systems. This training will help anyone because so much of what you learn you will use for the rest of your life whether it is hooking up tractor hydraulics or wiring a parallel electrical circuit in your shop.” Corbin M., BHS trainee 2015*



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*“The experiences I had gave me the confidence that I too could go to a technical school and succeed.”*

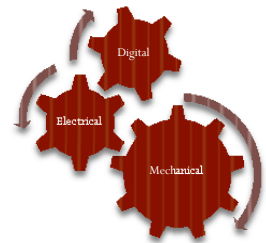
*Jake Larson, BHS  
Trainee, NTC HVAC  
Student*

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## How does it Work?

We begin by setting up trainees within the e-Learning system and providing access to the courses with an assigned username and password. Once a training program is established trainees then begin online e-Learning; and, trainee progress is monitored by the e-Learning administrator, Mark Dockter. Upon completion of the relevant e-Learning modules a lab is scheduled whereby the trainee utilizes a Mechatronics lab specifically designed to reinforce the theoretical principles studies and hands on skills demonstration and assessment by a qualified lab instructor.

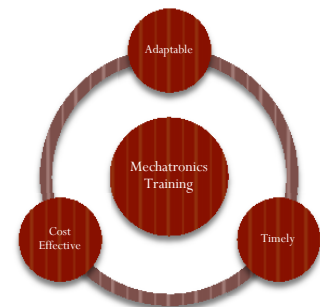
With the Mechatronics learning system the trainee develops an understanding of subsystem’s interrelationships and how they drive system



function as a combined whole. Trainees who advance through the entire Mechatronics training program learn comprehensive troubleshooting & systems analysis skills that will help grow a pipeline of qualified workers, improve worker’s basic skills and competency, reduce employee turnover, advance incumbent worker skills, improve employee satisfaction, increase productivity, reduce manufacturing costs, retain and attract new customers and maintain your competitive advantage.

Mechatronics training requires competency in ten core areas:

- Mechanical Fabrication
- AC/DC Electrical
- Basic Hydraulics
- Rotating Machines
- Mechanical Drives
- Intermediate Hydraulics
- Electric Motor Control 1
- Electric Motor Control 2
- Electro Fluid Power
- Programmable Controllers
- Mechatronics Capstone (Delivered in a face to face group setting only)





Upon successful completion of each of course trainees are eligible for certificates of completion. In addition, for those wishing to, trainees are eligible to take the Certified Production Technician exam from the Manufacturing Skills Standards Council, the gold standard in technical training in the United States.

The Minnesota Innovation Institute is an independent education and economic development organization located on the Northwest Technical College campus. and, led under Greater Bemidji. Mechatronics is NOT a Bemidji State University or Northwest Technical College program.

Alexandria Community and Technical College have provided Credit for Prior Learning for select courses. Bemidji State University and Northwest Technical College are in the process of evaluating college credit for each course and certificate.

## MECHATRONICS

With support from local companies and external funding, courses in the Mechatronics series are being made available to individuals wishing to gain new technical skills and explore career options. The first two courses are: Mechanical Fabrication and ACDC Electrical Systems.

## MECHANICAL FABRICATION

Mechanical fabrication grounds learners in the basic knowledge needed for assembly. Learners focus on the proper and safe application of hand tools. Mechanical fabrication builds knowledge in the many types of bolts, wrenches and other fittings commonly used in industry and how to properly apply them, including pneumatic fabrication fittings. It focuses on proper techniques for checking connections and testing fittings with an emphasis on safety. Proper tool use helps in many ways, including injury avoidance, fewer product quality issues, and lower tool breakage costs. Sample occupations using Mechanical Fabrication skills range from entry level manufacturing and assembly jobs, repair work and maintenance positions, to engineering and construction work. Mechanical Fabrication is a building block for any job requiring hand tools.

## AC/DC Electrical Systems

The AC/DC Electrical course teaches fundamentals of AC/DC electrical systems used for power and control in industrial, commercial, agricultural, and residential applications. Students learn industry-relevant skills included in subject areas such as Basic Electrical Circuits, Electrical measurement, Circuit Analysis, Inductance and Capacitance, Combination Circuits, and Transformers. Sample occupations using AC/DC electrical skills include carpentry, automotive, construction and manufacturing as well as many retail stores that include service shops such as Sears, WalMart, etc.

## PARTICIPANT ELIGIBILITY & EXPECTATIONS

The intent of this program is to provide short term training to upgrade technical skills and help individuals find jobs. Part of the coursework is completed through e-learning and simulation; and, part of the coursework requires practicing and demonstrating new skills in an instructor supervised lab located at the Minnesota Innovation Institute (located at Northwest Technical College.) Participants that are familiar with computers; have a good grasp of math concepts; and, a good work ethic will be successful.

Our expectations are that Trainees:

- Take the National Career Readiness Certificate exam;
- Attend and fully participate in lab sessions;
- Demonstrate a good work ethic by being on time and communicating any issues with instructors;
- Complete the e-learning and demonstration of skills; and,
- Complete a resume and attend at least one job interview. (We will assist you with arranging a job interview.)

## SCHEDULE & LOCATION

Participants will work on e-learning modules within a specified period and place at your respective location. Labs will be scheduled at the Minnesota Innovation Institute (located at Northwest Technical College Bemidji) by program administrator and will be arranged to mutual agreement of trainees.

## OPPORTUNITY:

By bringing together e-Learning, the core expertise of Certified Mechatronics trainers and hands on labs the trainee will experience a highly adaptable systems focused technical training program that helps to create knowledgeable technical workers that can work in a variety of industrial production jobs, technician and maintenance positions, and with additional college education fulfill engineering roles.

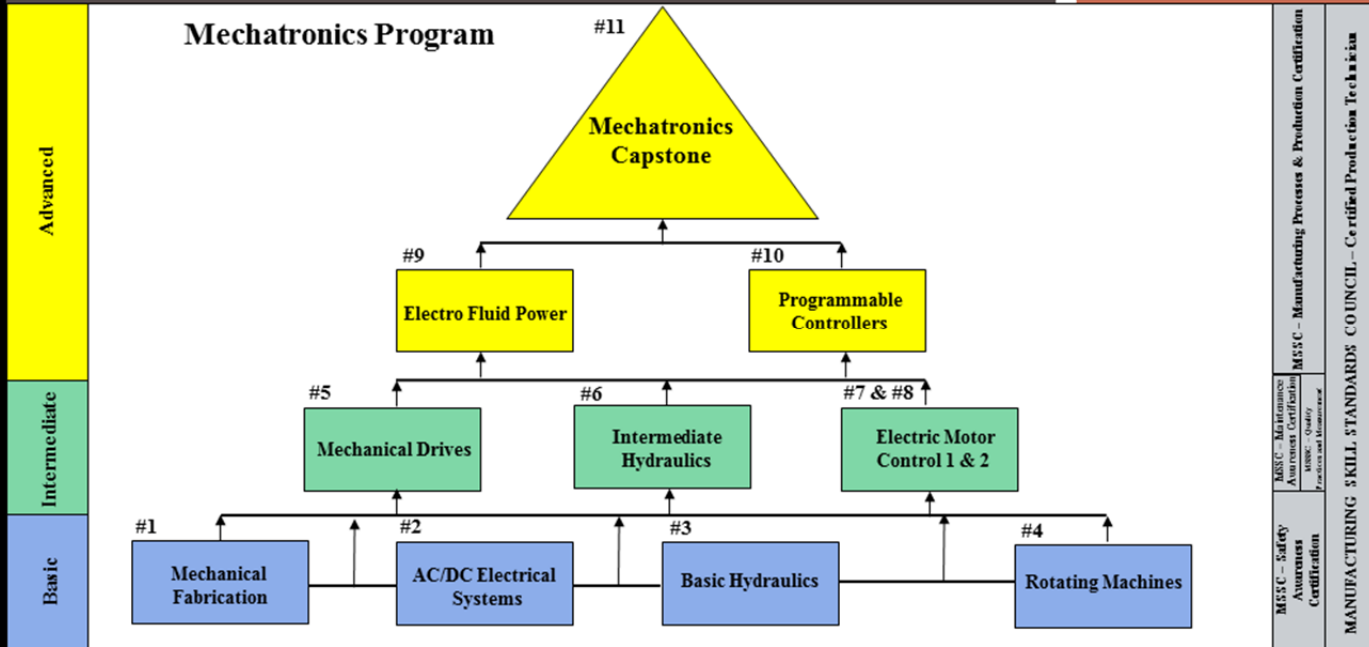
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# MINNESOTA INNOVATION INSTITUTE

High Performance Center



Estimated hours are e-learning time. Labs of 1-3 days are additional. At this time, Credit for Prior learning is available for select courses at Alexandria Technical and Community College. An e-assessment determines which courses, if any, may be satisfied based on proficiency. Certifications available.

The Minnesota Innovation Institute provides equal access to and opportunity in its programs, facilities, and employment.

