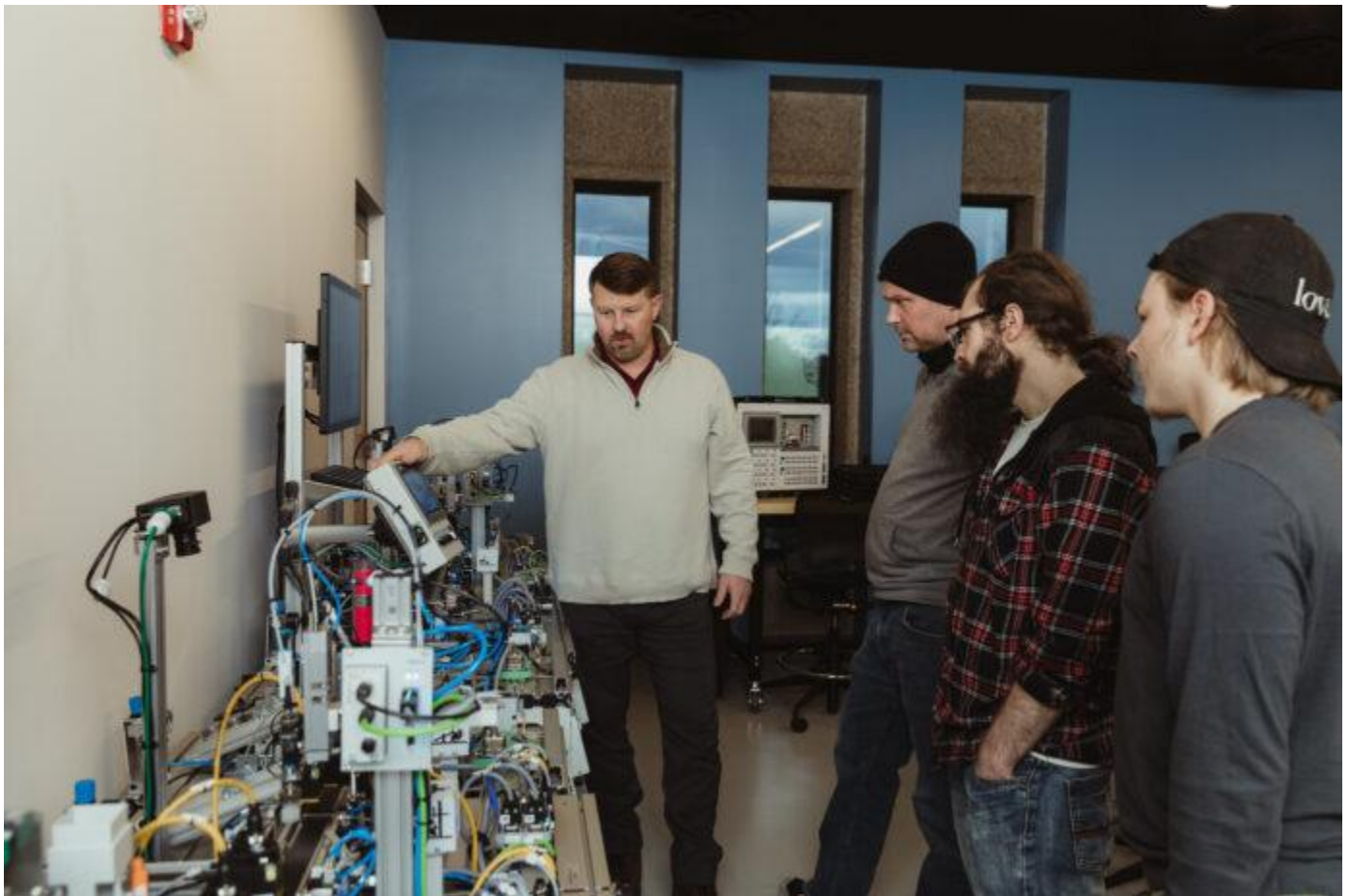


Laurel Ridge Community College

Mechatronics Handbook



Laurel Ridge Community College, Workforce Solutions Mechatronics Handbook

This enhanced Mechatronics program at Laurel Ridge Community College Workforce Solutions can teach the skills needed through hands-on learning, which will help students find a career as an electromechanical technician, production technician, or industrial maintenance technician, with excellent starting salaries. The average salary for a technician in our service region is over \$58,000.

Throughout the program students will learn to:

- Understand and implement safe operation and maintenance of machines and processes
- Troubleshoot and address common issues in electromechanical systems
- Perform routine maintenance activities
- Operate and maintain fluid power systems
- Perform basic robot programming and operation
- Identify and explain the components/functions of a PLC
- Understand and explain the basic concepts and terms of Industry 4.0 and how digitalization is impacting the industry, our daily lives, and cyber-security

Please review this handbook carefully so you fully understand the requirements for each course offered.

Local In-Demand Careers- Fast-Track Certifications to Get You There

- **Fundamentals of Electricity-** Decrease production downtime, improve efficiency and increase output – All hinges on understand electricity and how to work with it safely. These industry recognized certifications have been specifically developed to give students the knowledge and skills required to enable them to work safely and effectively with electricity. The lab components of the training offer the student the opportunity to build, test and troubleshoot AC/DC circuits and examine the operating voltages and currents related to proper circuit operation. Technicians will use various instruments to make circuit measurements and calculations.
- **Fundamentals of Mechanical Systems-** The driving force behind most industrial applications is Mechanical Systems. Gears, drives, bearings, pulleys, and more are found in nearly everything that moves. The Mechanical Systems course covers the installation, use, maintenance, and troubleshooting of mechanical drive components and systems. The industry recognized certification is divided into various topics which deal with the components encountered in industry. The learning is based on practical, hands-on tasks to build know-how in operating and maintaining these vital systems.
- **Fundamentals of Fluid Power**
Pneumatics- This pneumatic industry recognized certification training covers the use of compressed air for pneumatic control and as a signaling medium. A complete overview is given, covering compressors, storage, dryers and distribution as well as the design, construction and operation of a range of actuators, valves and ancillary equipment. The

relevant ISO symbols are introduced and included in the circuit diagrams. This course ensures a sound competence, the safe operation and maintenance of one of the most common automation elements in industry.

Hydraulics- This hydraulic industry recognized certification training is designed to familiarize students with the construction and operation of hydraulic components. Investigating the construction and operation of a range of hydraulic equipment, this hydraulic training course covers the fundamental principles of hydraulics as well as the individual components. Valves controlling pressure, flow rate, sequence and direction of flow are included, and practical exercises are used to demonstrate their operation, based on standard symbol circuits. Maintenance and a systematic approach to fault finding are also covered.

- **Fundamentals of Sensor Technology-** As manufacturing and industry become increasingly automated, the understanding of sensors is critical. Sensors are eyes, ears, touch, and feel of automated systems. They relay signals to the “brain” of the system in order for the system to react accordingly. This industry recognized certification will introduce the participant to various sensors common in the industrial automation field. Hands-on experience plays a central role in teaching the fundamentals of sensors. Examples are used to demonstrate the general operational principles of different sensors. Special attention is paid to the selection of the right sensor, its connection, the correct setting and functional checking.
- **Fundamentals of PLC-** Working with a PLC efficiently requires a strong familiarity with the specifics of the programming environment and languages. This is exactly the purpose of this industry recognized certification. The students will work with high-end products from Rockwell Automation/Allen Bradley. This training program allows students to acquire hands-on experience with industrial control equipment. Realistic examples are used to motivate students to gain the skills needed to work with PLC controlled systems – which surround us in our daily lives. As a Rockwell Encompass Partner, Festo’s training is well suited for this environment.
- **Fundamentals of Robotics-** Today, and in the future, robotics are becoming increasingly common. From repetitive tasks to highly complex interaction with humans, robots can be found. This industry recognized certification is designed to expose students to the various types of robots and the various ways they can increase productivity in industrial applications. While these robots can replace low skilled human tasks, they require people with technical skills to program, operate and maintain them. Upon completion of this industry recognized certification, students will have worked with various types and brands of robots – learning how to program, teach positions, and work safely with these critical elements of modern industry.

Admission Requirements

1. Must be at least 18 years old
2. Must have completed all prerequisites to register for the class. Please make sure to check the website for specific prerequisites associated with each program. You will not be permitted to register for a program without the necessary paperwork.
3. Must complete registration for the class, including payment to Laurel Ridge Community College. **Students must be registered 3 business days prior to the first day of class.**

Student Essential Soft Skills Standards

Students are encouraged to continually develop the following soft skills to be successful in the classroom and beyond. These skills will not only help you to **get** a job but also help you to **keep** the job.

1. Customer Service Skills
2. Written and Verbal Communication Skills
3. Teamwork and Collaboration
4. Adaptability
5. Critical Thinking/problem Solving Skills
6. Conflict Resolution
7. Time Management
8. Commitment
9. Leadership Skills
10. Strong Work Ethic

Student Essential Performance Standards

Students are expected to complete course requirements that prepare them to perform essential job functions in the Mechatronics field. These functions and skills are:

1. Speech: Establish rapport and communicate with classmates and instructors.
2. Hearing: Auditory acuity to perceive and interpret various equipment signals and to use the telephone.
3. Vision: Visual acuity to read any handwritten or printed data.
4. Mobility: Must be able to bend, squat or kneel and assist in lifting or moving equipment.
5. Manual Dexterity: Determine eye/hand coordination and manipulation of equipment
6. Fine Motor: Use hands for grasping, pushing, pulling, and fine manipulation and possess tactile ability sufficient for working with computer equipment.
7. Mentation: Ability to assimilate and apply knowledge acquired through lecture discussions and readings.
8. Writing: Communicate and organize thoughts to prepare written documents that are correct in style, grammar, and mechanics.

- Any student who thinks he/she does not possess one or more of these functions should contact the disability services provider at the campus. Provisions for accommodations will be made in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.
- [Review information about the Office of Accommodations and Disability Services](#) at the Laurel Ridge Community College website.

Books/Supplies

All books and supplies are included in the cost of tuition. You do not need to bring your own laptop; a computer will be provided during the class.

Grading System

Students must adhere to the attendance policy **AND** sit for the certification exam to receive a Certificate of Completion and comply with Fast Forward policies. Students will receive a Certificate of Completion via email from the Workforce Solutions Operations Team. Certificates will be emailed after class concludes, and attendance and grades are assigned. Timing may vary. It is expected that students participate and complete modules required in all materials provided. This includes, but are not limited to in class labs and NC3 labs.

At least 20 hours of reading and reviewing course material will be required outside of class to be successful. All hands-on preparation will be held during class time.

High Risk Class

This class/program is classified as "High Risk," meaning it involves activities that could potentially cause immediate, serious, and unique bodily harm to students in the learning environment. Before participating in ANY lab work, students must review the High-Risk Student Handbook and pass a safety test. Laurel Ridge Community College, along with your instructor, is dedicated to ensuring your safety. Each program adheres to the safety standards set by relevant governing bodies and organizations, including Light Brigade.

Safety equipment and PPE is a required part of curriculum and is therefore required during all lab activities. Here is a list of all safety equipment and PPE included in this program:

1. Safety Glasses- Regular corrective eyewear is acceptable if it covers the eye socket
2. Safety belts and protective gloves as needed
3. First Aid Kit

Lab Guidelines

To keep our labs up to standard for all classes and guests to our campus, everyone is expected to do their part in keeping the lab clean and ready it for the next class.

- Students should wear personal protection equipment relevant to the task they are performing when working in the lab - no exceptions ever
- No horseplay and ACT RIGHT
- Clean workbenches/tables
- Clean floor of any trip hazards, sweep if needed
- All equipment should be stored and organized
- No Food or Drink near any Mechatronics equipment or trainers

Certification Exam Information

Certification Exam Information- ALL TEST SCORES WILL BE SENT TO THE WORKFORCE SOLUTIONS OFFICE.

- Students will take their certification exam the last night of class unless otherwise communicated by the instructor. Those classes that have 2 exams, one of the two exams may be taken half way through the class.
- Exam details will be given in class.
- Students will have 1 week to complete the exam if not taken on the required testing night and must be prearranged with the instructor and the Program Manager.

Attendance Policy

Students are expected to be present, **on time**, and ready to participate in all regularly scheduled classes. This is a rigorous program, and attendance is VITAL to success. One of the top reasons why people are fired is for tardiness or not showing up for their scheduled shift! Workforce Solutions facilitates learning opportunities and connections that empower individuals, organizations, and communities. By meeting these expectations, students will be prepared for solid attendance at their future workplace.

1. Being tardy **more than 30 minutes** to class will count as an absence.
2. In case of an emergency or illness that will result in an absence, students are to contact the instructor prior to class.
3. Students must attend 75% of the class. Missing 25% or more of the class will result in dismissal from the program.

Grounds for Dismissal from the Program

Include but are not limited to:

1. Disrupting the learning environment
2. Failure to comply with safety standards
3. Any form of cheating or plagiarism
4. Missing 25% or more of regularly scheduled classes

No refunds will be given upon dismissal from the program. Students may follow the college's grievance process if they wish to have their decision reviewed.

Cancelled Classes

If for any reason the instructor needs to cancel a class, students will receive an email or phone call as soon as Workforce Solutions is notified. It is your responsibility to keep your contact information current so that we can reach you. Cancellations are not always system wide. Please check cancellation notices for specific campus details. Laurel Ridge Community College uses Laurel Ridge Alert to immediately contact you during a major crisis or emergency. For the latest emergency closing information, please sign up for the college alert system by texting laurelalert (all one word) to 226787.

Cell Phone/Electronics Policy

Cell phones may not be used during class. Students are not to take or place calls, send or receive text messages, or use social media applications during class. All cell phones are to be turned silent, not vibrate, while in class. The only exception is if the instructor asks you to use your phone for demonstration or instruction purposes.

See Something, Say Something

If you have a concern about something you've observed or heard that may give you concern about another student, impact the safety of our environment, or disrupt the delivery of our educational process, we encourage to fill out the [See Something, Say Something form](#).

Additional Resources

[Request assistance on Laurel Ridge Community Resources website page.](#)

- Struggling to make end meet? Single Stop
- Child Care Assistance
- Technology Assistance
- Transportation

This handbook should be used in conjunction with the complete Laurel Ridge Student Handbook for comprehensive guidance on all policies. This can be found at <https://catalog.laurelridge.edu/index.php?catoid=21>

This document is subject to change based on the needs of the program.

STATEMENT OF UNDERSTANDING

I have read, understand, and agree to abide by the requirements of the various courses as stated in The Mechatronics Student Handbook.

I have reviewed, understand, and agree to abide by the general policies of the College as stated in the [Laurel Ridge Community College Student Handbook](#) from the Laurel Ridge Community College website

As I complete the Mechatronic course(s), it is my responsibility to clarify what I do not understand regarding the requirements of the course with the instructor, in a proactive and professional manner.

Course: _____

Printed Name: _____

Signature: _____

Date: _____