

CraftED

Pre-Apprenticeship: Advanced Manufacturing & Mechatronics — Course Syllabus

Instructor: Dr. Colby Webb

Delivery Mode: Online (LearnDash + Weekly Teams Meetings)

Duration: 6 Weeks

Meeting Time: Saturdays at 5:00 PM (PST)

Teams Meeting Link: [Insert Microsoft Teams Link Here]

Course Overview

The Pre-Apprenticeship: Advanced Manufacturing & Mechatronics program prepares learners to enter apprenticeship programs or careers in advanced manufacturing, industrial automation, CNC machining, robotics, and electro-mechanical maintenance with a foundation of safety awareness, technical reasoning, and professional readiness. Over six weeks, participants will explore the manufacturing workforce, develop mechanical and electrical fundamentals, build systems-level thinking through schematic interpretation and PLC logic, and assemble a professional portfolio to document their competencies. This course aligns with WIOA career readiness standards and DOL-recognized O*NET pathways, and serves as a structured bridge to Registered Apprenticeship Programs or industry employment across advanced manufacturing and mechatronics sectors.

Course Objectives

- Identify advanced manufacturing and mechatronics career pathways and assess personal aptitude and interest alignment using the Ramsay MAT-5 assessment.
- Demonstrate OSHA-10 General Industry safety practices, including PPE selection, hazard identification, machine guarding, and lockout/tagout (LOTO) procedures.
- Identify, handle, and apply mechanical, precision, and electrical testing tools used in mechatronics and manufacturing environments.
- Apply precision measurement and metrology — recording dimensions to three decimal places, converting between imperial and metric, and performing tolerance pass/scrap analysis.
- Read and interpret electrical schematics, wiring diagrams, and ladder logic — tracing relay coil logic across voltage levels and designing safety-critical circuits.
- Build and troubleshoot a basic automated safety sequence using Arduino or simulation (Wokwi), and document the process using the PDCA troubleshooting cycle.
- Compile a professional portfolio demonstrating readiness for advanced manufacturing employment or apprenticeship.
- Develop a career roadmap with immediate, mid-term, and long-term goals aligned to a specific O*NET manufacturing pathway.

Weekly Breakdown

Week	Focus Area	Key Lessons & Tasks	Apply & Reflect
1	Introduction to Advanced Manufacturing & Mechatronics	Manufacturing systems overview; automation trends; career pathways and O*NET codes; Ramsay MAT-5 aptitude assessment	Career pathway research & comparison chart; Ramsay score analysis & trade alignment pitch
2	Workplace Safety & Professional Culture	OSHA-10 General Industry: PPE, hazard awareness, machine guarding, LOTO; general workplace professionalism and team communication	OSHA-10 enrollment evidence & trade connection; communication scenarios & 3-day practice log
3	Core Technical Foundations	Tools & Equipment of Mechatronics: mechanical, precision, and electrical testing tools; foundational math, measurement, and metrology	Starter toolbox build & micro-simulation log; metrology data sheet & tolerance scrappage challenge
4	Systems Thinking & Automation Awareness	Reading schematics, diagrams, & process flows; ladder logic and relay logic; introduction to automation, PLCs, and PDCA project skills	HVAC schematic annotation & Dual-Hand Safety Press design; Arduino/Wokwi safety interlock build & PDCA log
5	Energy Efficiency, Sustainability, and Troubleshooting	System efficiency evaluation and root cause analysis; technical documentation and reporting	Efficiency observation and diagnostic workflow; professional incident report writing
6	Career Launch and Professional Portfolio	Resume building and certification alignment; career roadmap and immediate launch steps	Tailored resume draft; career roadmap with 0–12 month action plan

Assignment Submission Requirements

Each week, students are required to submit two completed documents for each lesson:

Apply Submission Document — a structured response form demonstrating comprehension and skill application for that lesson. Students complete all tables, response boxes, diagnostic exercises, and field observation entries directly in the document.

File naming format: Lastname_Week#.LessonNumber.pdf (e.g., Smith_Week4.8.pdf)

Student Reflection Form — a self-assessment tool covering concept confidence ratings, open questions, and connection to career goals. Completed honestly — not for the instructor, but for the student.

File naming format: Lastname_Week#.LessonNumber_Reflection.pdf (e.g., Smith_Week4.8_Reflection.pdf)

Both documents must be submitted as PDFs to the assignment portal each week. Students should also save copies to their Career Portfolio Google Drive folder in the corresponding ApplyAndReflect subfolder.

Late submissions will be accepted up to 72 hours after the deadline with a 10% deduction. Submissions beyond 72 hours require instructor approval and may affect portfolio completion standing.

Self-Starter Expectations

This is a self-directed online program. Success depends on your ability to take initiative, manage your time, and hold yourself accountable — skills that are equally valued on any job site.

Students are expected to:

- Log in and engage with each lesson before the Saturday Teams meeting — come prepared with questions.
- Complete all Apply Submission Documents and Reflection Forms by the posted weekly deadline without reminders.
- Treat each assignment as a professional deliverable, not a worksheet — formatting, accuracy, and care reflect your readiness to enter the advanced manufacturing workforce.
- Reach out proactively if you are falling behind — do not wait until the end of the week.
- Demonstrate the same reliability and initiative in this course that employers will expect on Day 1 of your apprenticeship.

The trades reward people who show up prepared and ready to work. In advanced manufacturing and mechatronics environments, the standard is higher — automated systems that fail affect production, quality, and worker safety. That standard begins here.

Portfolio Requirements & Google Drive Setup

Each learner will maintain a Google Drive portfolio folder as digital documentation of technical skills, field observations, and growth across the program.

Setup Instructions:

- Create a folder titled “Lastname_Firstname_MfgPortfolio”.
- Inside, create subfolders:
 1. Resume
 2. Certifications
 3. FieldObservations
 4. ApplyAndReflect
 5. CareerRoadmap
 6. FinalPortfolio
- Set sharing permissions to ‘Anyone with the link: Viewer’.
- Upload weekly assignments to the corresponding folders.
- Submit your Drive link in the Week 6 submission area.

Certifications

Credential	Issued By	Description & Purpose
OSHA-10 General Industry	<i>U.S. Department of Labor / OSHA Authorized Trainer</i>	Verifies understanding of basic workplace safety, PPE, hazard identification, machine guarding, and worker rights. One of the most valued entry-

		level safety credentials across advanced manufacturing and industrial trades. (Delivered via authorized training partner integration or accepted upload of prior certification.)
Pre-Apprenticeship Completion Certificate	<i>CraftED Workforce Solutions (WIOA-aligned)</i>	Confirms completion of a structured pre-apprenticeship meeting DOL and state workforce readiness standards. Can be shared with apprenticeship sponsors or employers to verify preparedness for advanced manufacturing and mechatronics sector entry.
Digital Portfolio & Career Roadmap Validation	<i>Instructor-Signed Credential</i>	Serves as verified documentation of the learner's technical skills, field observations, reflections, and career plan — a critical tool when applying for advanced manufacturing apprenticeships or employer-sponsored training programs.

Assessment Overview

Category	Weight	Description
Apply & Reflect Assignments	40%	Weekly skill demonstration tasks — written responses, diagnostic exercises, field observations, and professional documentation entries.
Quizzes (Weeks 1–5 + Capstone Final)	30%	Weekly knowledge checks covering lesson content, plus a 30-question capstone final assessment covering all six weeks.
Portfolio & Career Roadmap	20%	Capstone evidence of readiness — compiled work from Weeks 1–5, career roadmap, and strongest-piece reflection.
Participation & Teams Sessions	10%	Attendance, engagement, and professionalism across weekly synchronous sessions.

Exit Interview & Graduation Policy

Completing all six weeks of coursework and submitting your portfolio does not automatically guarantee graduation, program certification, or placement into an apprenticeship or interview.

Exit Interview

All students who complete their coursework will participate in a structured Exit Interview conducted by the instructor or a designated program reviewer. The purpose of this interview is to assess whether the student is genuinely prepared to represent CraftED in a professional employment or apprenticeship setting. The exit interview evaluates:

- Professional communication and presentation
- Demonstrated understanding of advanced manufacturing and mechatronics technical content from Weeks 1–6
- Quality and completeness of the portfolio, field observation entries, and career roadmap
- Evidence of the self-starter mindset and real career action steps taken
- Overall conduct, reliability, and professionalism throughout the program

Grade Submission & Placement Readiness

Following the exit interview, the instructor will submit a final grade and a readiness determination. Students should be aware of the following:

- Graduation and program certification are contingent on both academic performance and the instructor's professional assessment of the student's readiness.
- Placement into an employer interview or apprenticeship referral is not guaranteed. It is earned through demonstrated commitment, consistent performance, and professional conduct across the full six-week program.
- If the instructor determines that a student is not yet ready for placement — due to incomplete work, insufficient skill demonstration, or professionalism concerns — the student will be so notified in writing following the exit interview.

Re-Application Policy: *Students who are not cleared for graduation or placement may re-apply to the program after a minimum waiting period of six (6) months from the date of their exit interview notification. Re-admitted students are expected to demonstrate meaningful growth in the areas identified during their initial review.*

This policy exists to protect the integrity of the CraftED program and the value of its credentials. Advanced manufacturing employers and apprenticeship sponsors rely on our recommendation as a signal of genuine readiness. We take that responsibility seriously — and so should you.

Professional Conduct & Communication

Learners are expected to maintain professionalism in all meetings and submissions. Communicate respectfully, arrive on time, and complete assignments with integrity. Instructor communication is available via Teams or email, with responses typically within 24 hours Monday–Friday.