

Welcome to the HI-TEC Session:

*Exposing High School Students to Hands-on
Web-Based Dual-Credit Mechatronics Courses*

Wednesday, July 26, 2023
10:15 am to 11:00 am





Enhancing the Independent Mechatronics Technical Curriculum and Creating a New Pathway from Rural High Schools into Mechatronics Careers (iMEC 2.0)





Goal

Increase the number of Mechatronics and Process Instrumentation and Control (PIC) technicians to meet workforce demands in Minnesota and Nebraska by enhancing and expanding a high-quality/low-cost distance education model to create a new pathway to Mechatronics programs in partnership with rural high schools.

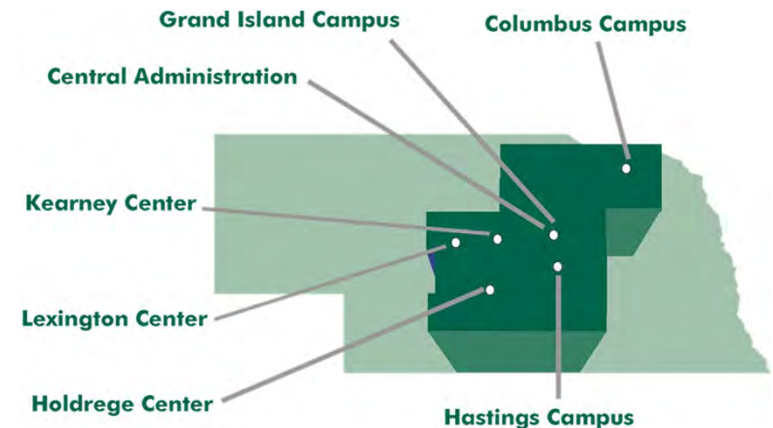


iMEC 2.0

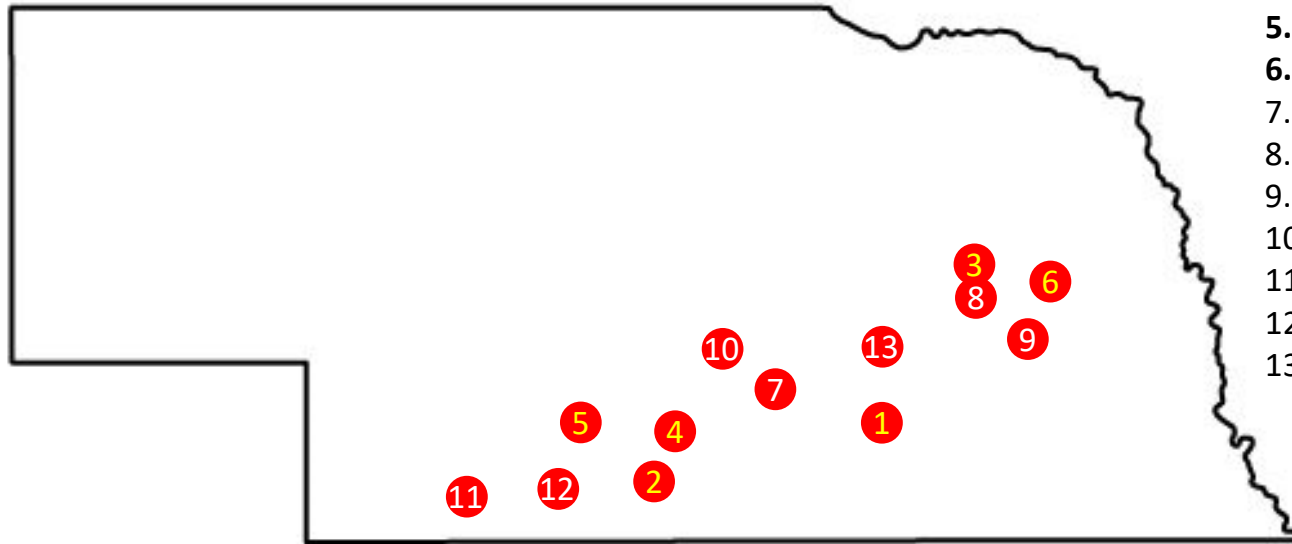
Proposes to create a distance learning-based technical career pathway for secondary students in at least twelve high schools in two states. The pathway will ladder into the Mechatronics Associated of Applied Science (AAS) degree programs at South Central College (SCC) in Minnesota and Central Community College (CCC) in Nebraska.

About CCC

- CCC is a multi-campus, comprehensive community college serving a 25-county area in central Nebraska with a population of more than 300,000. CCC has three campuses and three educational centers within their 14,000 square mile service area.



iMEC 2.0 Nebraska High Schools – 200+ miles



1. **Aurora HS** – Kurtis Lathrop
2. **Axtell HS** – Josef Philippi
3. **Columbus Lakeview HS** – Joe Haschke
4. **Kearney HS** – Andrew Olson
5. **Lexington HS** – Tim Potter
6. **Schuyler HS** – Donald Seehusen
7. **Grand Island Northwest HS** – John Hadenfeldt
8. **Columbus HS** – Adam Whitmore
9. **Aquinas HS** – Roger Gallaway
10. **St. Paul HS** – Dustin Nilson
11. **Cambridge HS** – Jeff Spaulding
12. **Arapahoe HS** – Jeff Spaulding
13. **Central City HS** – Brandon Wright

About SCC

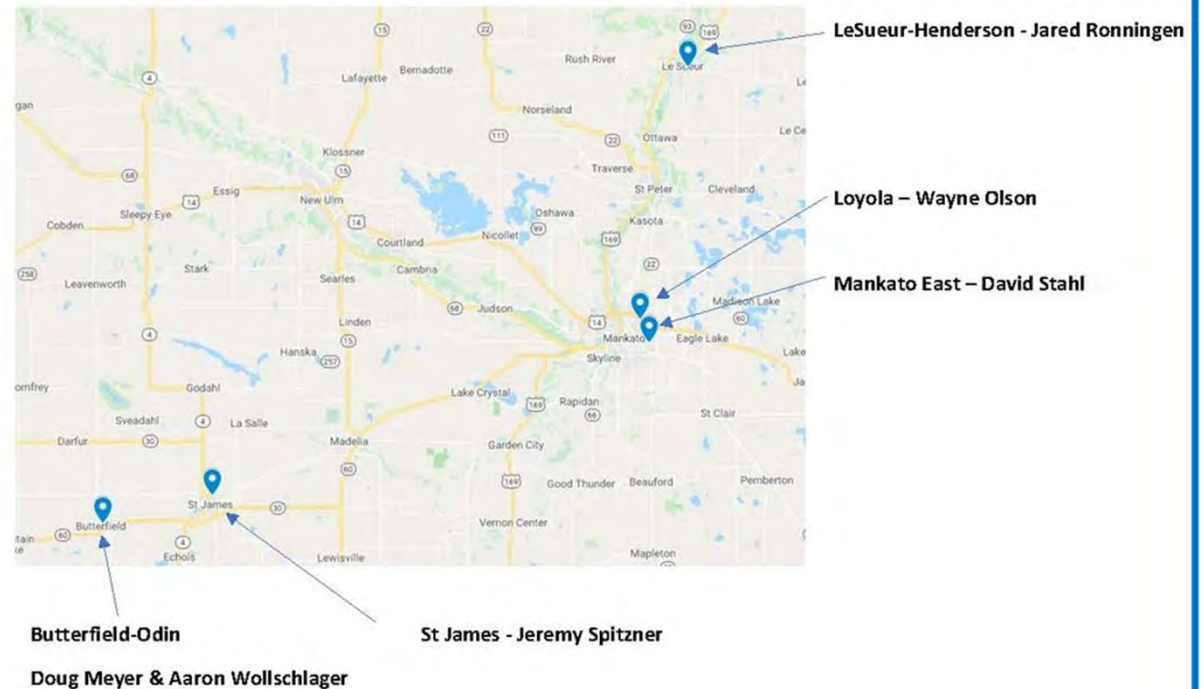
- SCC is a two-year comprehensive community and technical college which serves 12 counties in south central Minnesota with a population of 359,055. The service area, which covers approximately 7,261 square miles has campuses in North Mankato and Faribault, MN.



iMEC 2.0 Minnesota High Schools



South Central College Mankato Service Area





Objective 1 Curriculum

- Establish distance-based Mechatronics and Process Instrumentation and Control (PIC) Technology programming that prepares high school students for occupations by utilizing advanced interactive hands-on and simulation equipment with distance learning strategies.
 - ***Concepts of Electronics I***
 - ***Intro to Instrumentation***
 - ***Intro to Programmable Controllers***
 - ***Applications of Industrial Sensors***





Objective 1 Curriculum

- Establish a modular course format –
 - *Discovery* – Study Guide
 - *Application* – lab activities
 - *Reinforcement* – homework
 - *Reflection* - quiz





Objective 2

Business and Industry Leadership Team

Develop and utilize a *Business and Industry Leadership Team* (BILT) to:

- Develop curriculum
- Select equipment
- Professional development mentor - educators and students
- Promote career awareness
- Enhance project sustainability



Industry Partners



Objective 3

Recruitment of High Schools and Faculty Professional Development

Establish early college *Mechatronics* and *PIC* career pathways at a distance in rural high schools by identifying, recruiting and supporting high school faculty to act as facilitators for iMEC 2.0 courses.





Professional Development





Professional Development



iMEC2.0

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NSF Award Number # 2037491

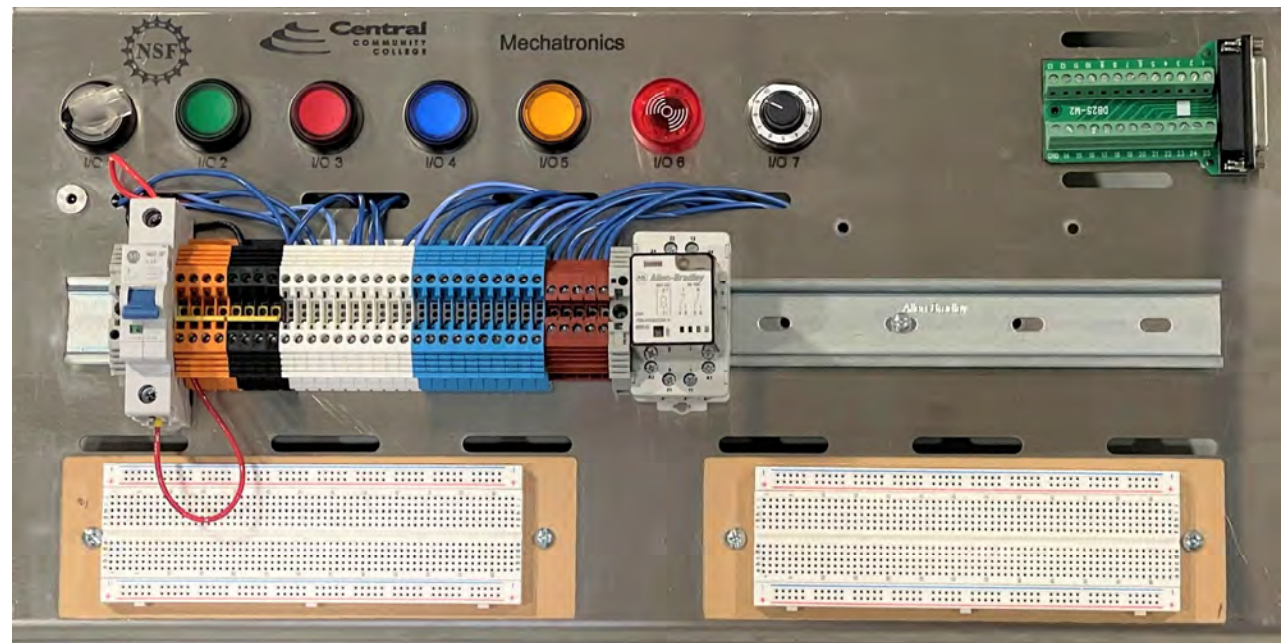


School Requirements

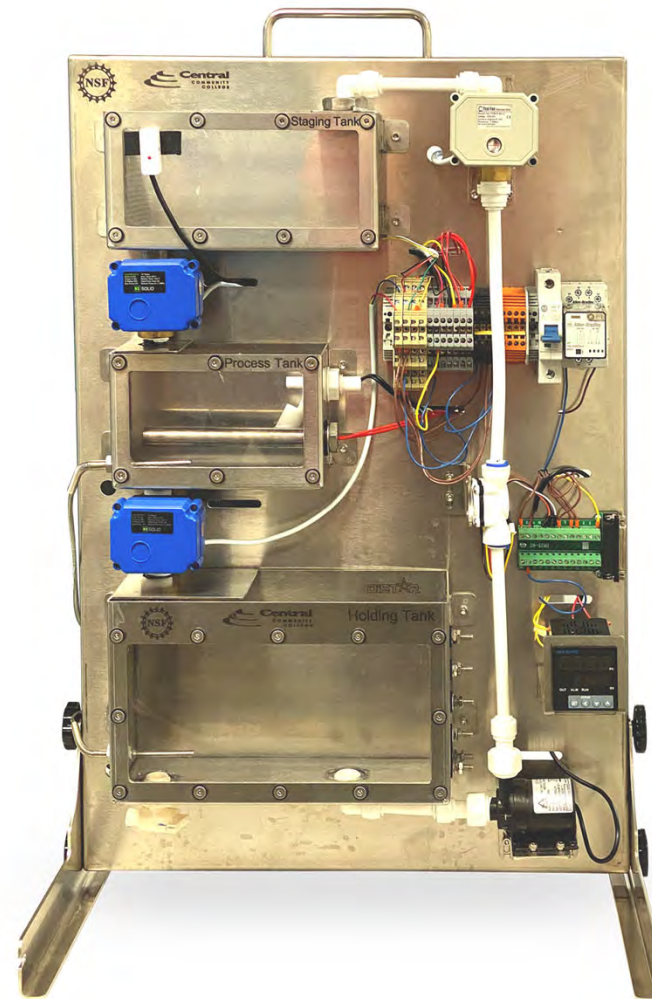
- Assign a teacher/facilitator to the classroom
- Commit classrooms and storage areas
- Have computers available to students
- Market classes to students
- Offer one course each semester the first year
- Offer two courses each semester the second and third year
- Attend six to eight days of professional development each year
- Only available to students interested in college credit



Concepts of Electronics I Trainer

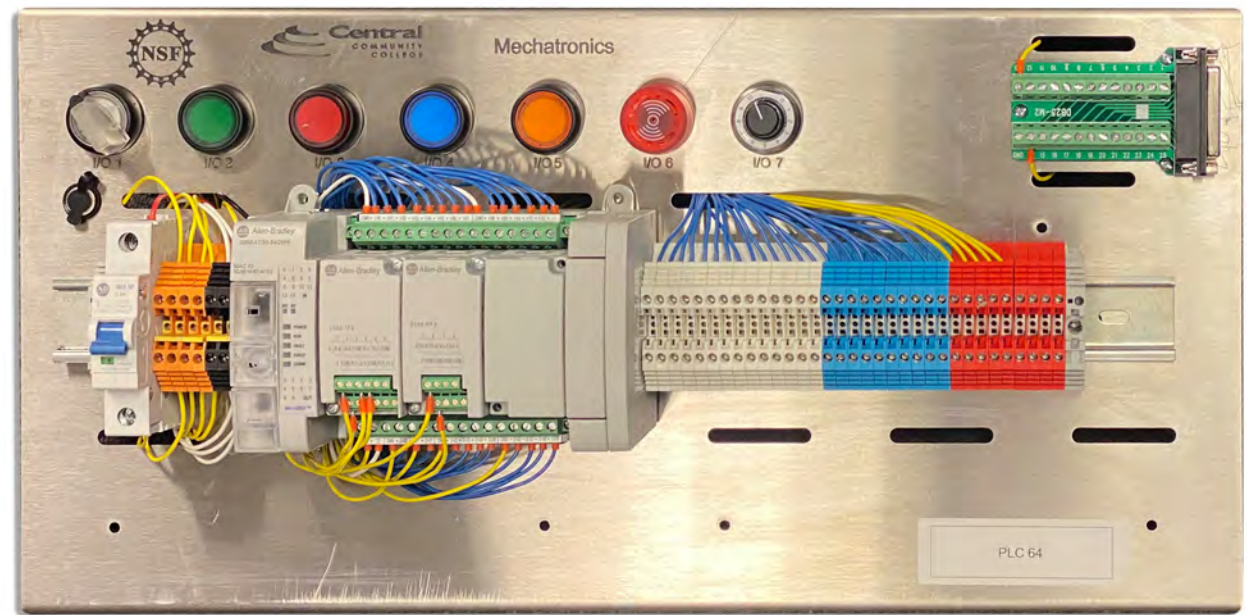


Introduction to Instrumentation Trainer



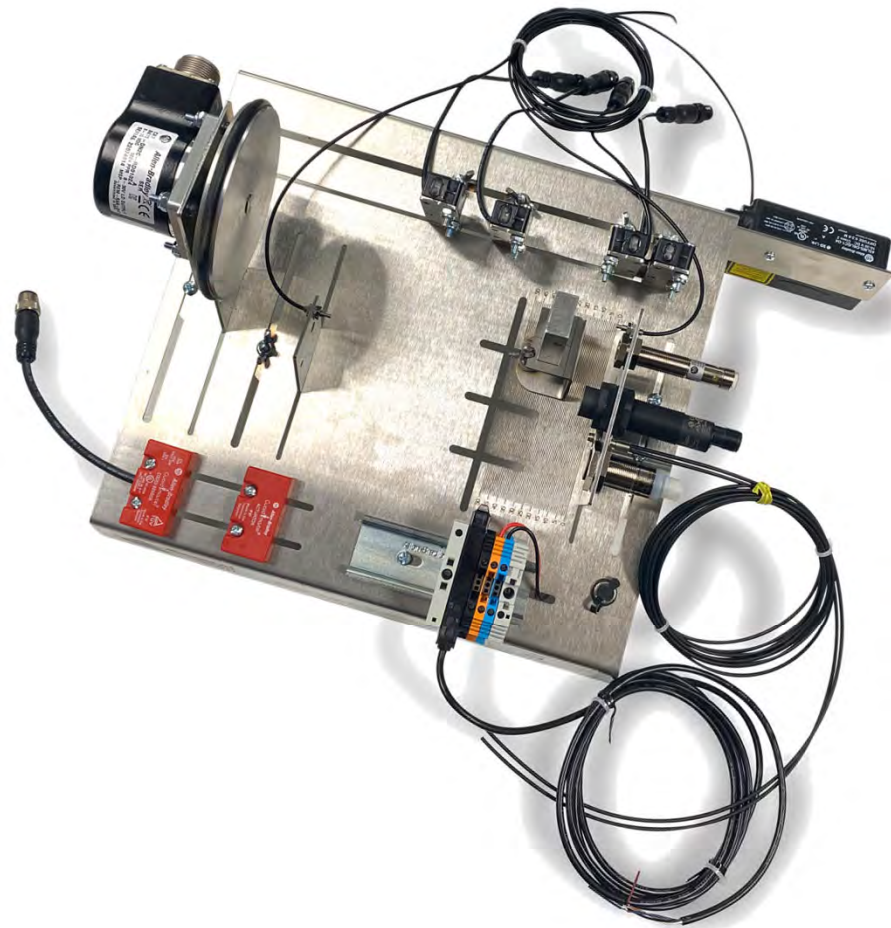


Introduction to PLC Trainer





Industrial Sensors Trainer



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Lessons Learned and Best Practices for Web-based CTS Courses

- Selecting facilitators
- Industry involvement
- Hands-on trainers
 - one-to-one
- Identify adjunct instructors early
- Web-based courses open new opportunities
- Waiving tuition
 - exposure to Mechatronics



Lessons Learned and Best Practices for Web-based CTS Courses

- Freeing up faculty has been difficult
 - serving internal students
- Building rapport with schools is critical
- Use of laptops versus chromebooks or tablets (e.g. – iPads)
- Sharing grades with high schools
 - waiver forms
- Storage space in high schools
- Develop/utilize videos (ideally less than 3 minutes)
- Minimize reading requirements – students tend to disengage



Lessons Learned and Best Practices for Web-based CTS Courses

- Register students for classes as early as possible
- Establish a consistent format of modular course delivery
- Only allow students who are interested in credit
- High school facilitators are limited –
 - “They already have a full schedule”



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