

## Coordinating Commission for Postsecondary Education Review of Existing Instructional Programs

**Institution:** Central Community College      **Program:** Mechatronics

I certify the following:

- the information provided regarding this program is accurate
- the above named institution has in place a procedure for reviewing instructional programs
- such review took place and was presented to the institution's governing board on **May 18, 2023**
- the governing board's action was:

Signed: \_\_\_\_\_ (Date)  
(Chief Academic Officer or designated representative)

### Evidence of Demand and Efficiency

		17-18	18-19	19-20	20-21	21-22	5 yr avg
<b>Student Credit Hours (SCH)</b>		979	1167	1381	1249	1864	1328
<b>Faculty Full-time Equivalency (FTEF)*</b>		4.06	4.22	5.63	5.01	4.96	4.78
<b>SCH/Faculty FTE</b>		241.13	276.54	245.29	249.3	375.81	277.82
<b>Number of Degrees and Awards</b>  <i>(list degrees/awards separately)</i>	<b>AAS</b>	9	8	11	20	16	12.8
	<b>Diploma</b>	9	15	14	23	20	16.2
	<b>Certificate</b>	33	64	87	80	78	68.4
	<b>Total Awards</b>	51	87	112	123	114	97.4
	<b># of Unduplicated Graduates</b>	32	45	53	52	48	46.0

*\*By term analysis combined to conduct an annual review. Numbers reported reflect 2 different negotiated contract periods (FA17-SU20 and FA20-SU22)*

**Evidence of Need** (provide a detailed explanation below or attach documentation)

**Justification if the program is below either of the CCPE thresholds—complete page 2**

\_\_\_\_\_  
For CCPE use: reviewer/date

**Justification if the program is below CCPE thresholds—check one or more boxes and provide a detailed explanation or attach a document**

Program is critical to the role and mission of the institution (detailed explanation).

Program contains courses supporting general education or other programs (detailed explanation).

Interdisciplinary program (providing the program meets the requirements set in the existing policy for interdisciplinary programs) (explain).

Student or employer demand, or demand for intellectual property is high and external funding would be jeopardized by discontinuing the program (explain).

Program provides unique access to an underserved population or geographical area (explain).

Program meets a unique need in the region, state, or nation (explain).

Program is newly approved within the last five years (no additional justification needed).

Other (detailed explanation).



## **Mechatronics**

### **Coordinating Commission Seven-Year Review 2023**

*Information in this report reviewed and recommended to cabinet:*

Central Community College Educational Services, 4/27/2023

*Recommended continuation of programs without monitoring:*

Central Community College College Cabinet, 05/4/2023  
Central Community College Board of Governors, 05/18/2023-pending

**Brent Konwinski** – Program Faculty  
**Jared Pettit** – Program Faculty  
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**Nate Allen**, Ed.D. – Dean of Instruction, Career & Technical Sciences  
**Chris Waddle**, J.D. – Division Vice President, Career & Technical Sciences

# **Mechatronics**

## *Program Review Summary – Dr. Nate Allen*

The Mechatronics (INDT) program continues to be a successful program within the Career and Technical Sciences division at Central Community College, serving the manufacturing industry with three full-time instructors at the Columbus campus, one full-time instructor at the Kearney Center and one adjunct instructor in Columbus. The program offers specializations in both electromechanical systems and process instrumentation and controls. The Kearney Center offers certificates and diplomas.

Economic Modeling Specialist International (EMSI) data suggests the industry needs for electromechanical and instrumentation technicians is growing and will continue to grow within the CCC service area, the state of Nebraska, and nationally. Technicians to construct systems, repair and maintain equipment and facilities will be needed as long as we are manufacturing and operating facilities.

The Mechatronics program continues to be an important program that produces graduates in demand and supported by business and industry in the area. As systems become more and more complex, employees with this kind of background are and will be in high demand. The Mechatronics program enjoys a good reputation in the service area and will continue to do so with continuously updated instructional proficiency, curriculum, equipment, and facilities. Faculty are continually working with local industry to ensure our curriculum and our hands-on learning/training equipment is relevant and current.

A grant funding provided by the National Science Foundation (NSF) through our Community and Workforce Education (CWE) division has been utilized to provide a pathway for high school students to be introduced to electronics, instrumentation, programmable logic controllers (PLCs), and industrial sensors while earning college credit. This pathway allows students to continue to the Mechatronics program upon high school graduation with as many as 12 credits completed in the Mechatronics Associate of Applied Science (AAS) degree. This has begun to establish a pipeline for students into the INDT program.

New for 2023: the INDT program has purchased new equipment which includes an Industry 4.0 MPS 402-1 Station. This station is a miniature factory that allows students to learn hands-on programming and troubleshooting of automation in a manufacturing environment. Other new equipment includes the addition of Fluke TRMS Multimeters (12), Festo Lasers Alignment Shafts (2), and Oscilloscopes (2). This new equipment gives the students experience with the latest equipment that they will encounter after graduation and upon entering the workforce.

The Mechatronics program exceeds the minimum threshold for award. Career and Technical Sciences leadership recommends continuation of the program.

I. **Program:** **Mechatronics (INDT)**

II. **College Mission:** Central Community College maximizes student and community success.

III. **College Vision: The Best Choice –**

**for students to achieve their educational goals.**

- quality education
- personal service and individualized attention
- exceptional and passionate faculty and staff
- extraordinary value

**for developing a skilled workforce.**

- employability and/or successful credit transfers
- graduates who advocate for CCC
- business and industry partnerships
- state-of-the-art facilities and technologies

**for advancing communities.**

- educational partnerships
- strong alumni support
- foster economic development
- sustainability leaders

IV. **Program Mission Statement:** The Mechatronics program maximizes student and industry success.

V. **Program Vision Statement:** Central Community College's Mechatronics program will be recognized as a leader in creating progressive and current educational experiences for students entering the industrial technology and robotics industry. The program will become the educator of choice among students and incumbent workers in this industry.

The Mechatronics program will support economic development in the area by developing and training technicians and updating existing skills in the workforce. The program will offer a cutting-edge level of technology to assist in maintaining and providing a high-level craftsperson in the available labor pool to encourage area economic development and redevelopment.

Due to the scope and the complexity of the Mechatronics program, faculty specialization and expertise will be maintained through regular training opportunities.

## EMSI Q4 2022 Data Set

EMSI data is a hybrid dataset derived from official government sources such as the US Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics.

Leveraging the unique strengths of each source, our data modeling team creates an authoritative dataset that captures more than 99% of all workers in the United States. This core offering is then enriched with data from online social profiles, resumes, and job postings to give you a complete view of the workforce.

## Report Parameters

### 10 Occupations

Electrical and Electronic Engineering Technologists and Technicians (17-3023)

Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)

Industrial Engineering Technologists and Technicians (17-3026)

Calibration Technologists and Technicians (17-3028)

Engineering Technologists and Technicians, Except Drafters, All Other (17-3029)

Insulation Workers, Mechanical (47-2132)

Electrical and Electronics Repairers, Commercial and Industrial Equipment (49-2094)

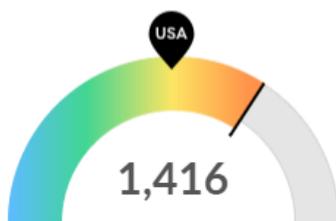
Control and Valve Installers and Repairers, Except Mechanical Door (49-9012)

Industrial Machinery Mechanics (49-9041)

Power Plant Operators (51-8013) Chief Executives (11-1011)

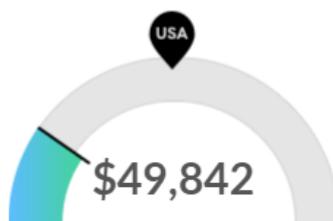
## Executive Summary

### Average Job Posting Demand Over a Deep Supply of Regional Jobs



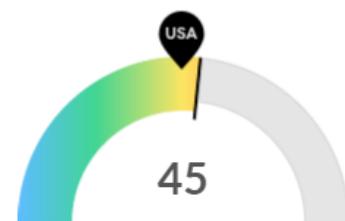
Jobs (2022)

Your area is a hotspot for this kind of job. The national average for an area this size is 852\* employees, while there are 1,416 here.



Compensation

Earnings are low in your area. The national median salary for your occupations is \$60,598, compared to \$49,842 here.



Job Posting Demand

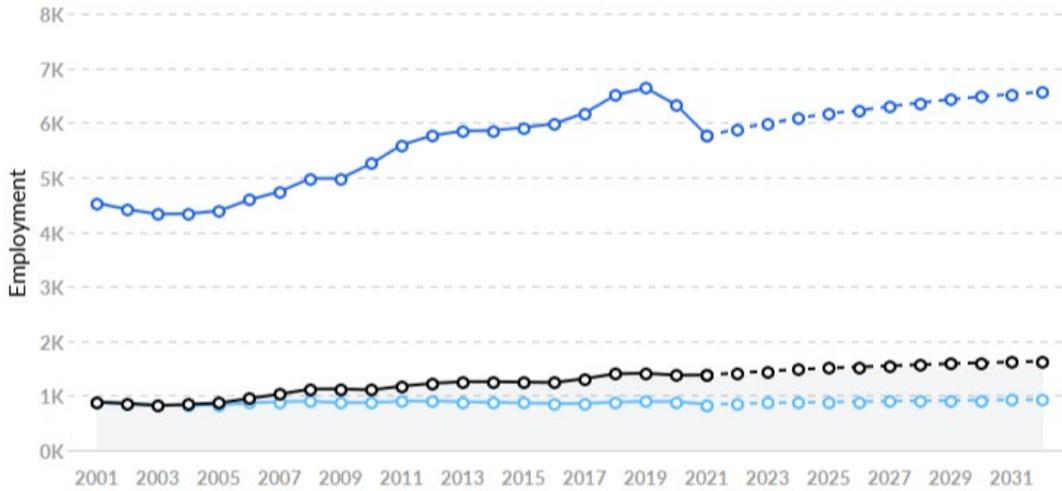
Job posting activity is about average in your area. The national average for an area this size is 40\* job postings/mo, while there are 45 here.

\*National average values are derived by taking the national value for your occupations and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.

# Jobs

## Regional Employment Is Higher Than the National Average

An average area of this size typically has 852\* jobs, while there are 1,416 here. This higher than average supply of jobs may make it easier for workers in this field to find employment in your area.

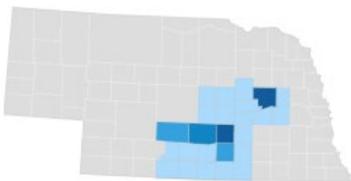


Region	2022 Jobs	2027 Jobs	Change	% Change
● CCC Service Area	1,416	1,545	129	9.1%
● National Average	852	897	45	5.3%
● Nebraska	5,884	6,298	415	7.1%

\*National average values are derived by taking the national value for your occupations and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.

## Regional Breakdown

County	2022 Jobs
Platte County, NE	347
Hall County, NE	305
Buffalo County, NE	215
Adams County, NE	129
Dawson County, NE	124



### Most Jobs are Found in the Animal Slaughtering and Processing Industry Sector



Industry	% of Occupation in Industry (2022)
Animal Slaughtering and Processing	15.6%
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	12.1%
Motor Vehicle Parts Manufacturing	7.3%
Medical Equipment and Supplies Manufacturing	6.5%
Basic Chemical Manufacturing	5.3%
Building Equipment Contractors	4.6%
Other	48.6%

## Compensation

### Regional Compensation Is 18% Lower Than National Compensation

For your occupations, the 2021 median wage in your area is \$23.96/hr, while the national median wage is \$29.13/hr.



# Job Posting Activity



**534 Unique Job Postings**

The number of unique postings for this job from Jan 2022 to Dec 2022.



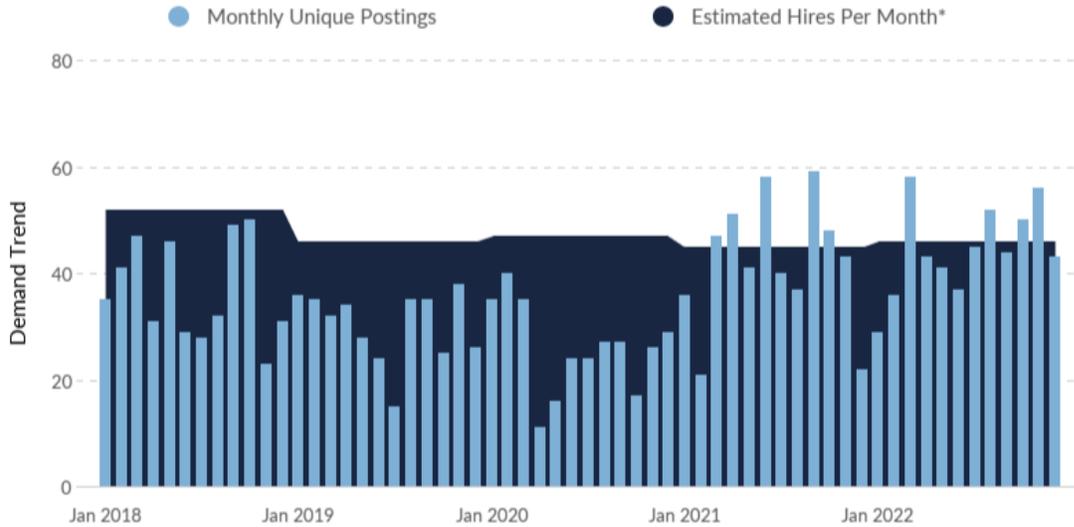
**112 Employers Competing**

All employers in the region who posted for this job from Jan 2022 to Dec 2022.



**26 Day Median Duration**

Posting duration is 1 day shorter than what's typical in the region.



Occupation	Avg Monthly Postings (Jan 2022 - Dec 2022)	Avg Monthly Hires (Jan 2022 - Dec 2022)
Industrial Engineering Technologists and Technicians	30	1
Industrial Machinery Mechanics	5	35
Electrical and Electronic Engineering Technologists and Technicians	4	1
Engineering Technologists and Technicians, Except Drafters, All Other	1	2
Electro-Mechanical and Mechatronics Technologists and Technicians	1	0
Control and Valve Installers and Repairers, Except Mechanical Door	2	0
Power Plant Operators	1	0

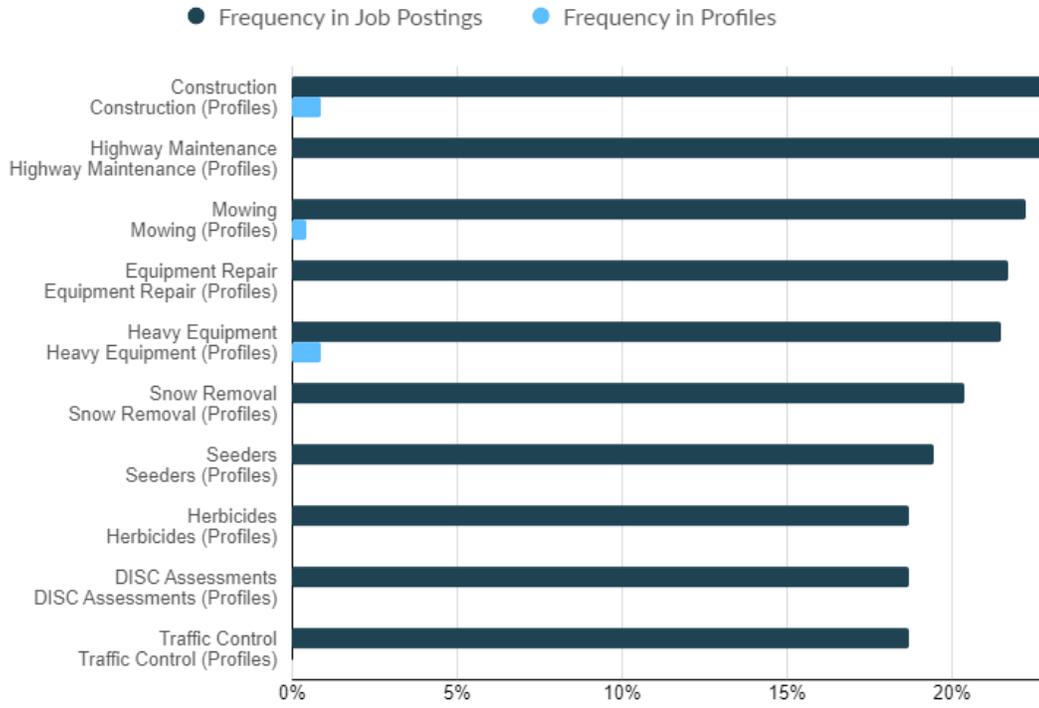
\*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Lightcast hires are calculated using a combination of Lightcast jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

Top Companies	Unique Postings
State of Nebraska	100
Vishay Intertechnology	29
BD	27
Green Plains	25
Essential Personnel	15
Nebraska Department Of T	12
Chief Industries	10
Valero Energy	10
American Foods Group	9
Bass Pro Corporate	9

Top Job Titles	Unique Postings
Highway Maintenance Wor	122
Maintenance Technicians	81
Maintenance Mechanics	24
Process Operators	24
Production Technicians	16
Controls Technicians	13
Electrical Controls Technici:	9
Maintenance Workers	9
Process Technicians	9
Equipment Maintenance Te	8

# Top Specialized Skills

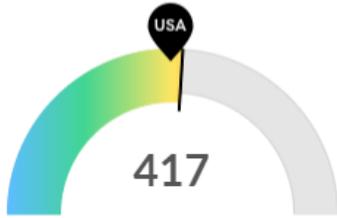
## Top Specialized Skills



Skills	Postings	% of Total Postings	Profiles	% of Total Profiles
Construction	122	23%	2	1%
Highway Maintenance	122	23%	0	0%
Mowing	119	22%	1	0%
Equipment Repair	116	22%	0	0%
Heavy Equipment	115	22%	2	1%
Snow Removal	109	20%	0	0%
Seeders	104	19%	0	0%
Herbicides	100	19%	0	0%
DISC Assessments	100	19%	0	0%
Traffic Control	100	19%	0	0%

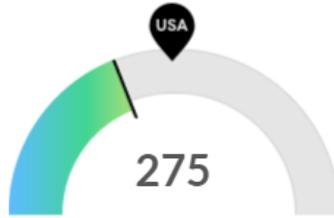
# Demographics

Retirement Risk Is About Average, While Overall Diversity Is Low



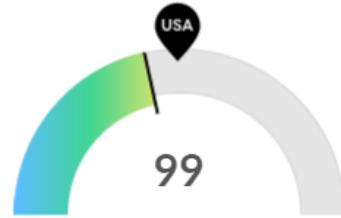
**Retiring Soon**

Retirement risk is about average in your area. The national average for an area this size is 394\* employees 55 or older, while there are 417 here.



**Racial Diversity**

Racial diversity is low in your area. The national average for an area this size is 398\* racially diverse employees, while there are 275 here.



**Gender Diversity**

Gender diversity is low in your area. The national average for an area this size is 122\* female employees, while there are 99 here.

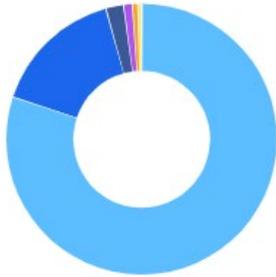
\*National average values are derived by taking the national value for your occupations and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.

## Occupation Age Breakdown



	% of Jobs	Jobs
14-18	0.4%	5
19-24	5.8%	80
25-34	18.3%	252
35-44	22.4%	308
45-54	22.8%	314
55-64	24.7%	340
65+	5.6%	77

## Occupation Race/Ethnicity Breakdown



	% of Jobs	Jobs
White	80.0%	1,101
Hispanic or Latino	15.7%	216
Black or African American	2.1%	29
Asian	1.0%	14
Two or More Races	0.6%	9
American Indian or Alaska Native	0.4%	6
Native Hawaiian or Other Pacific Islander	0.1%	2

## Occupation Gender Breakdown



	% of Jobs	Jobs
Males	92.8%	1,277
Females	7.2%	99

## Graduate Pipeline



**5 Programs**

Of the programs that can train for this job, 5 have produced completions in the last 5 years.



**257 Completions (2021)**

The completions from all regional institutions for all degree types.



**162 Openings (2021)**

The average number of openings for an occupation in the region is 27.

CIP Code	Top Programs	Completions (2021)
47.0303	Industrial Mechanics and Maintenance Technology/Technic	123
48.0501	Machine Tool Technology/Machinist	109
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Mai	19
15.1701	Energy Systems Technology/Technician	6
Top Schools		Completions (2021)
Central Community College		257

### 2023 Summary of EMSI Q4 2022 Data Set:

Job growth in the CCC service area has outpaced both the state (7.1%) and the national average (5.3%) with a total growth of 9.1%. Projections indicate more than 129 new jobs in the service area over the next five years. The average hourly rate of \$23.96/hr. is lower in the CCC service area versus the national average of \$29.13/hr. This may be due to higher concentration of generally lower salaries in the Midwest. Advertisements of job openings for INDT related activities accounted for 534 unique job postings from 112 competing employers. The most desirable skills employers are looking for include construction, highway maintenance, mowing, equipment repair, heavy equipment operation, snow removal, and seeding. The report indicates a disparity in racial diversity of only 20% versus the national average of 25% and a lack of gender diversity with males representing 93% of all students in the field. Graduates of the CCC INDT program represent all graduates in the service area, and completers in this program represent 6.8% of award recipients last year.

#### A. Supporting Data

##### a. Awards

Degree/ Credential Awarded	17-18	18-19	19-20	20-21	21-22	5-yr avg
<b>AAS</b>	9	8	11	20	16	12.8
<b>Diploma</b>	9	15	14	23	20	16.2
<b>Certificate</b>	33	64	87	80	78	68.4
<b>Total Awards</b>	51	87	112	123	114	97.4
<b># Of Graduates</b>	32	45	53	52	48	46.0

### 2023 Summary of Awards (2021-22 data):

Although we see a slight decrease in diploma and certificates. The five-year average is still on the upswing (+25%).

##### b. Student Credit Hours Produced per Faculty FTE

	2017-18	2018-19	2019-20	2020-21	2021-22	5-year average*
<b>Student Credit Hours (SCH)</b>	979	1167	1381	1249	1864	<b>1328</b>
<b>Faculty Full-time Equivalency (FTE)</b>	4.06	4.22	5.63	5.01	4.96	<b>4.78</b>
<b>SCH/Faculty FTE</b>	241.13	276.54	245.29	249.3	375.81	<b>277.82</b>

Source: Program Stats by Alpha and Instructor-Student FTE reports.

\*By term analysis combined to conduct an annual review. Numbers reported reflect 2 different negotiated contract periods (FA17-SU20 and FA20-SU22)

**2023 Summary of the Student Credit Hours per Faculty FTE (2021-22 data):**

The SCH/FTE is well above the average for the last five years. This is concerning with the implementation of the IMEC program, as this should only increase further with a lot more potential students enrolling into the program. This brings up the concern about adding faculty to support the program further. The FTE to SCH ratio is too large to maintain a quality program. Additional qualified faculty are needed to provide a quality learning experience in the ever-changing world of mechatronics.

There was a significant increase in SCH in 2021-22 well above the 5-year average. This helped to boost SCH/faculty FTE also above the 5-year average.

**2023 Summary Statement:**

Our Mechatronics program continues to be an important program that produces graduates in demand and supported by business and industry in the area. As systems become more and more complex, employees with this kind of background are and will be in high demand. The Mechatronics program enjoys a good reputation in the service area and will continue to do so with continuously updated instructional proficiency, curriculum, equipment, and facilities. We are continually working with local industry to make sure what we are using and teaching is up-to-date.