

North Dakota's Polytechnic Institution

Building workforce talent to drive the economy

HOUSE APPROPRIATIONS COMMITTEE
FEBRUARY 1, 2021
Dr. Doug Jensen, President





BISMARCK
STATE COLLEGE

North Dakota's
Polytechnic Institution

**COMMUNITY
DEVELOPMENT**



**BUILDING
SUSTAINABLE
COMMUNITIES**



**ECONOMIC
DEVELOPMENT**

**WORKFORCE
DEVELOPMENT**

7:2:1 RATIO

of the 21st Century Workplace

7



Associate Degree or Industry-Recognized Certification Holders

2



Bachelor Degree Holders

1



Graduate Degree Holder



polytechnic.

Hands-on learning. **WORKFORCE READY.**

At North Dakota's Polytechnic Institution, learning is hands-on and grounded in the principles of STEAM (science, technology, engineering, the arts and mathematics). The curriculum is designed in collaboration with business and industry partners focusing on high-priority occupations. Students learn during internships, through cooperative projects and in state-of-the-art classrooms. Whether studying arts and sciences or pursuing highly technical programming, North Dakota's Polytechnic prepares students to be workforce ready and succeed wherever their educational journey takes them.



STUDENT

You choose. You learn.
You gain practical skills for the workplace and life.



EMPLOYER

You consult. You support.
You design curriculum, enhance community, and help shape lives.



THE POLYTECHNIC ADVANTAGE

Hands-on practical and purposeful learning.

Flexible career pathways that fit your life.

Professional connections to enrich your career.

**FLEXIBLE.
AFFORDABLE.
TRANSFERABLE.**

Maximize your potential at:
bismarckstate.edu/polytechnic



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INTERNET of THINGS INDUSTRY 4.0



COMMUNICATIONS

- Global access
- Reduce costs and energy



INDUSTRIAL

- Smart Connected Products
- Quality Control



UTILITIES

- Demand management
- Response Applications



AUTOMOTIVE

- Streamline manufacturing
- Analyze vehicle behavioral data



RETAIL

- Personalized advertisements
- Automated checkouts



MEDICAL

- Maintaining uptime of devices
- Remote monitoring



AGRICULTURE

- Soil quality
- Weather conditions



ENVIRONMENTAL

- Weather Analysis
- Reduce traffic congestion



MILITARY/DEFENSE

- Recognize/Identify targets
- Defense intelligence



HOME

- Smart Temperature Control
- Optimized energy use





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**ADDITIVE
MANUFACTURING**



**INTERNET OF
THINGS**



**MES/MOM ADVANCED
PROCESS CONTROL**



**AUGMENTED
REALITY**



CLOUD



**INDUSTRY
4.0**



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CYBERSECURITY



**SYSTEM
INTEGRATION**



**DATA SCIENCE
BUSINESS INTELLIGENCE**



**DIGITAL TWIN/ SIMULATION/
OPTIMIZATION**



ROBOTS

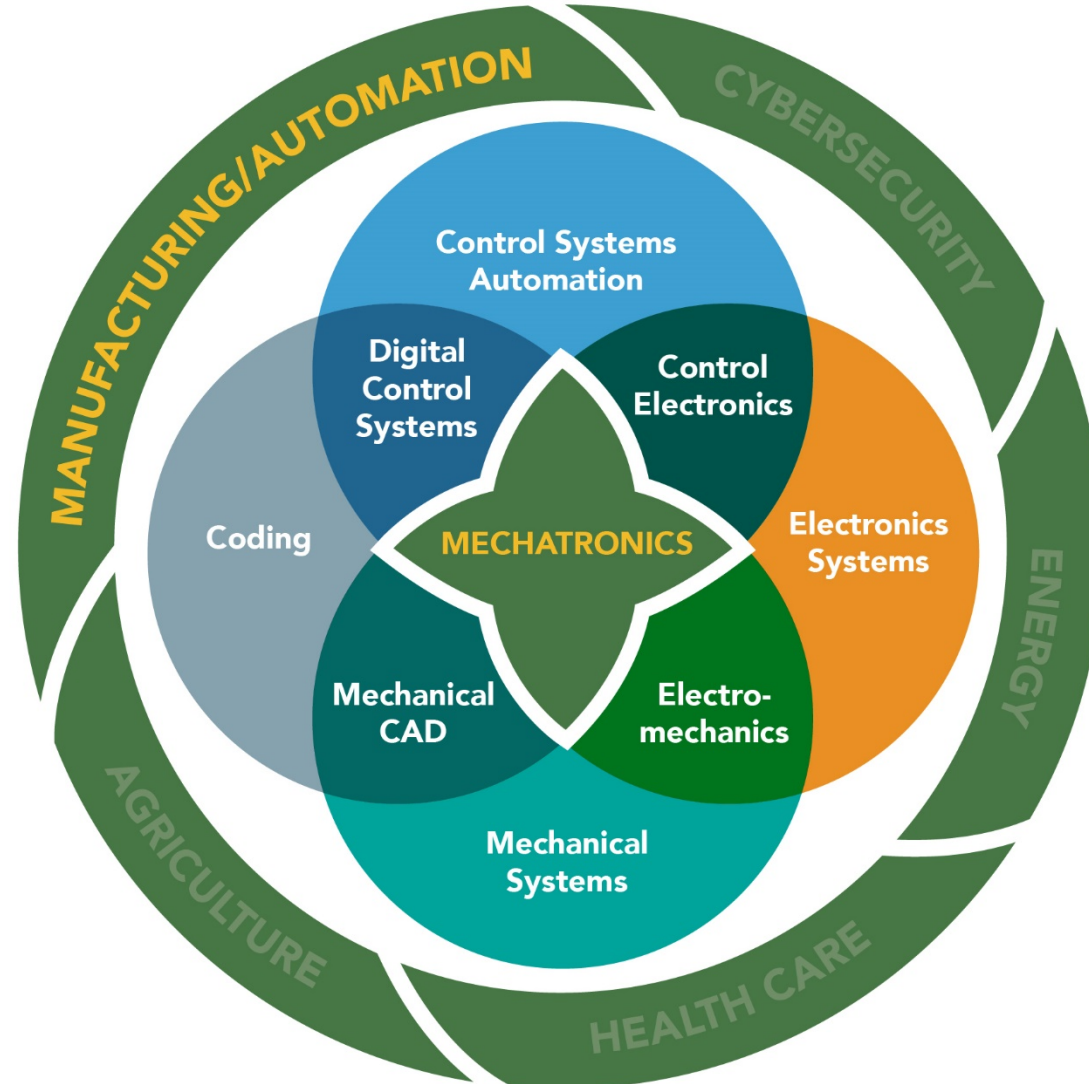




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FLEXIBLE. AFFORDABLE. TRANSFERABLE.

MECHATRONICS PATHWAY



7:2:1

CAREER PATHWAY

INDUSTRY
4.0



INDUSTRY SPECIFIC
CERTIFICATE

MECHATRONICS
SYSTEMS OPERATOR
CERTIFICATE
(16 Credits)

INDUSTRY SPECIFIC
CERTIFICATE

MECHATRONICS
SYSTEMS
TECHNICIAN 1 MSTI
CERTIFICATE
(16 Credits)

1 YEAR TECHNICAL
DIPLOMA
MECHATRONICS

GENERAL ED.

ADVANCED
TECHNOLOGY
DEGREE

MECHATRONICS
SYSTEMS
TECHNICIAN 2 MSTI
CERTIFICATE
(16 Credits)

STANDARD
ASSOCIATE IN
INDUSTRIAL
AUTOMATION
DEGREE

TRADITIONAL
DEGREE PATH

BACHELOR'S
DEGREE OF
APPLIED SCIENCE
IN MECHATRONICS

STANDARD
ASSOCIATE IN
AUTOMATION
TECHNOLOGY
DEGREE
OR
ADVANCED
TECHNOLOGY
DEGREE

GENERAL ED.
LIBERAL ARTS
GRADUATION REQ.

PUBLIC PRIVATE PARTNERSHIPS & CAREER PATHWAYS

EMPLOYER

Advance North Dakota's Polytechnic Institution

- Invest in students - (**We Need To Keep Our Talent Here**) they stick, they stay
 - In 2017, **81.4%** of ND high school graduates who earned an associate's degree from BSC stayed in the state for employment or re-enrolled in an NDUS school within one year of graduation
- Investment will drive ND future digital economy
 - Design, develop and implement new cyber and digital 2- and 4-year degrees
 - Expand business and industry partnerships to grow and retain Talent
 - Advance ND's economic development
- **Emerging Technologies Will Require Highly Skilled Talent**



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Advance North Dakota's Polytechnic Institution

- Build the highly-skilled talent for industry needs
 - High priority occupations, high-demand career/job
- Implement high-demand emerging and advancing technology degrees/programs
- Design, develop and implement **stackable certificates**, two- and four-year degrees
 - Automation Management/Industrial Automation
 - Mechatronics Engineering
 - Supply Chain and Logistics Management
 - Process Control and Instrumentation
 - Other high priority degrees as defined by industry
- Establish and offer **industry recognized employer-led workplace credentials and pathways**
- Establish new career pathways for students in K-12
 - Students will graduate HS with college credentials

Support Collaboration with Career Academies

- Increase K-12 collaboration around **Industry 4.0 and digital careers**
 - Coding, cybersecurity, and digital skill demand
 - Students Should be Industry 4.0 and Cyber Proficient at Graduation
- Enhance partnerships, opportunities and collaboration
 - **Hands-on Experiential Project Learning**
 - Cyber Range
 - Emerging Digital Academy
 - Critical Thinking and Problem Solving
 - Global Markets - Communication Skills

Polytechnic Infrastructure

- **Nontraditional** academic spaces/buildings
 - Bring public and private sectors together to advance economic growth and technology advancement
 - Flexible industrial labs (mega labs) - 30,000 SF open flex space
- **Adaptive and configurable** instructional spaces
 - Project-based, hands-on experiential learning
 - Support industry and instructional projects
- Production and fabrication **Flex-Lab space**
 - Applied hands-on experience practical learning in Industry Setting
- **Integrated** learning space
 - **Multiple instructional activities occur simultaneously in the same space**
 - Reduces costs and allows future planning as new technologies emerge

Polytechnic Infrastructure

- **Flexible** presentation space (auditorium)
 - Presentations (formal and informal)
 - Group projects
 - Community and business gatherings - Emerging Technologies and New Process
 - Large speaking, presentation, performance activities
- Polytechnic Sector (**collaborative presentation and meeting area**)
 - Automation
 - Energy
 - Healthcare
 - Agriculture
 - Cybersecurity

Polytechnic Infrastructure

- Conferences and assemblies
 - Business attraction
 - Economic development
 - Product and technology announcements
 - Innovation advancements gatherings
 - Support economic expansion and growth presentations

Note: Flexible and Adaptive Space were public and private sector can demonstrate the economic value of business opportunity in North Dakota and develop the talent needed for the region to grow and expand economically.

Polytechnic Programming

- **Supports 5-7** new BAS programs in high demand areas
 - **Advanced Manufacturing, Mechatronics Applied Engineering, Automation, Digital, Supply Chain/Logistics, etc.**
- Each new polytechnic program requires
 - Capital investment for equipment and program facility enhancements
 - Faculty with industry experience
 - Curriculum and content development - Industry Led
 - Instructional and lab materials and supplies
 - Expand recruitment and partnership development

Note: There is a Four-year delay in receiving funding for these instructional expenses



- Flexible space
- Movable walls
- Floor space, floor load
- Door sizes
- Loading docks
- Second floor access
- HVAC load
- Equipment ventilation







Questions/ Comments?





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