

TECHNOLOGY & INNOVATION

Centers of Workforce Innovation for:

Data Science

Cybersecurity

Programming &
Software Development

Research &
Development



NJ PATHWAYS
TO CAREER OPPORTUNITIES

YEAR ONE: 2022-2023

COLLABORATIVES

Industry Partners



CENTERS OF WORKFORCE INNOVATION

Education Partners

COMMUNITY COLLEGES

Atlantic Cape Community College
Bergen Community College
Brookdale Community College
Camden County College
County College of Morris
Essex County College
Hudson County Community College
Mercer County Community College
Middlesex College
Ocean County College
Passaic County Community College
Raritan Valley Community College
Rowan College at Burlington County
Rowan College of South Jersey
Salem Community College
Sussex County Community College
Union College of Union County, NJ

8 FOUR-YEAR COLLEGES & UNIVERSITIES

Adelphi University (NY)
Broward College (FL)
Fairleigh Dickinson University
New Jersey Institute of Technology (NJIT)
Ramapo College of New Jersey
Rutgers University
Rowan University
Thomas Edison State University
William Paterson University

20 HIGH SCHOOLS

Applied Technical High School at Bergen Community College
Bergen County Technical High Schools (Paramus Campus)
Bound Brook High School
Cape May County Technical High School
Cumberland County Technical Education Center
Essex County Schools of Technology
Franklin Township High School
Gloucester County Institute of Technology
Hopatcong High School
Hudson County Schools of Technology
Jersey City Public Schools
Kearny High School
Manville High School
Middlesex County Magnet Schools
Morris County School of Technology
Newton High School
Somerset County Vocational Technical Schools
Sussex County Technical School
Thomas Edison Energysmart Charter School
William L Dickinson High School

8 LABOR UNIONS

Eastern Atlantic States Regional Council of Carpenters
International Brotherhood of Electrical Workers Local 102
International Brotherhood of Electrical Workers Local 269
Heat and Frost Insulators and Allied Workers Local 32
International Union of Operating Engineers Local 825
Ironworkers Local Union 399
NJ Administrative District Council of Bricklayers and Allied Craftworkers
Sheet Metal Workers International Association Local Union 25

4 OTHER PARTNERS

Bergen Community College - NJ EcosySTEM (NJ Nest)
Health Information Management Systems Society
New Jersey Coalition of Automotive Retailers (NJ CAR)
Project Self Sufficiency
Rowan University/Rutgers-Camden Board of Governors

NJ Pathways To Career Opportunities

New Jersey's Community Colleges and the New Jersey Business and Industry Association (NJBIA) have joined together to launch an unprecedented education and training pathways initiative that will strengthen the state's workforce for residents, businesses, and the economy for years to come.

This initiative, NJ Pathways to Career Opportunities: Aligning Education to Build an Innovative Workforce, brings together employers, industry associations, labor unions, education institutions, and workforce development partners to provide students and workers with the education and career pathways they need to find new careers and opportunities to achieve a competitive wage, and to ensure that employers have access to a highly skilled workforce to meet critical labor market needs.

The Pathways Initiative is comprised of four Industry Collaboratives which are inclusive groups of industry leaders and educational partners across the state focused on the four key industries of the state's economy: (1) Health Services, (2) Infrastructure and Energy, (3) Manufacturing and Supply Chain Management, and (4) Technology and Innovation. The Pathways Initiative is expanding economic mobility for students and adult learners and drive economic growth for the state's employers.

There are 10 Centers of Workforce Innovation led by Community Colleges in partnership with other education partners across the state to:

DEVELOP new curriculum and strengthen existing education and workforce training aligned with the needs of employers that spans the education continuum from high school, to Community College (credit and non-credit), to 4-year colleges and universities, and promotes the movement of students along pathways.

SHARE curriculum widely with other education institutions across the state and provide professional development for faculty and instructors so they may deliver the pathways developed.

CREATE model agreements and partnerships to support pathways including dual enrollment programs between high schools and colleges, 1+1 partnerships between Community Colleges, and 2+2 and 3+1 agreements between Community Colleges and 4-year colleges and universities.

PRODUCE Prior Learning Assessment (PLA) solutions.

CENTERS OF WORKFORCE INNOVATION

**THE TECHNOLOGY & INNOVATION SECTOR
OF THE NJ PATHWAYS INITIATIVE
FOCUSES ON TWO CAREER AREAS:**

DATA SCIENCE

CYBERSECURITY

**PROGRAMMING
& SOFTWARE
DEVELOPMENT**

**RESEARCH &
DEVELOPMENT**

EDUCATION AND TRAINING PARTNERS

**4-YR COLLEGES
& UNIVERSITIES**

**ADULT LITERACY
TRAINING PROVIDERS**

**COMMUNITY BASED
TRAINING PROVIDERS**

**COMMUNITY
COLLEGES**

**PRIVATE CAREER
SCHOOLS**

**VOCATIONAL TECHNICAL
& COMPREHENSIVE
HIGH SCHOOLS**

INDUSTRY ACTION TEAMS

EMPLOYERS

**INDUSTRY
ASSOCIATIONS**

LABOR UNIONS

Community College Partners

DATA SCIENCE

- Brookdale Community College
- Camden County College
- County College of Morris
- Middlesex College

PROGRAMMING & SOFTWARE DEVELOPMENT

- Essex County College
- Middlesex College
- Ocean County College

CYBERSECURITY

- Bergen Community College
- Camden County College
- Ocean County College
- Raritan Valley Community College
- Rowan College of Burlington County

RESEARCH & DEVELOPMENT

- Bergen Community College
- Middlesex College

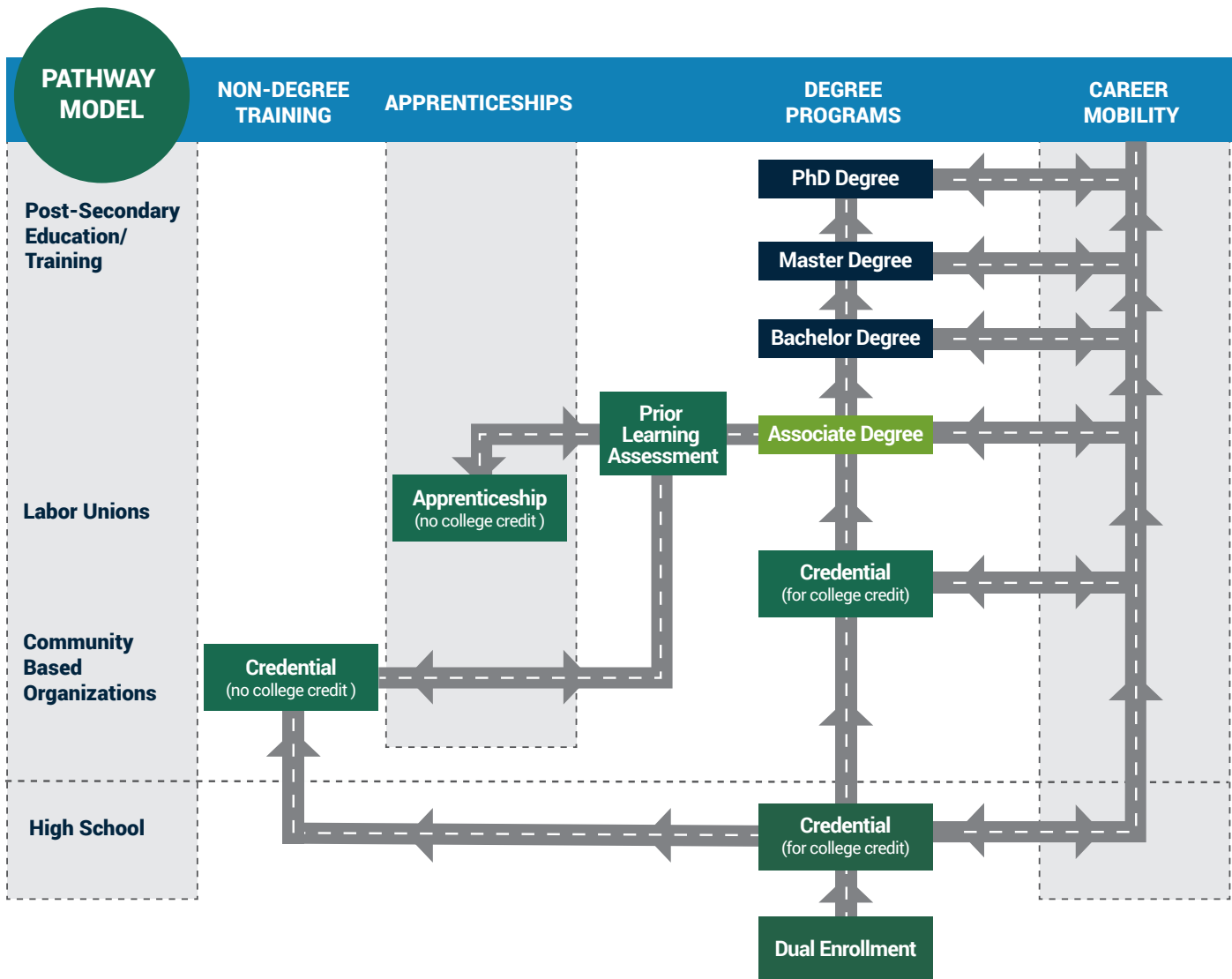


What's in this Brochure?

This brochure details the exhaustive work of the cross-education sector partners of the Centers of Workforce Innovation (high schools, Community Colleges, four-year colleges and universities, labor unions, private career schools, community-based training providers, and others). The Centers are not buildings but instead are groups of cross-education sector partners working together to create and enhance academic and workforce development training programs so that every New Jersey residents' participation in these programs (no matter the education or training institution) results in (or leads closer to) the attainment of industry credentials and/or college degrees.

Rarely are individuals' education and training pathways linear or a straight line. There are stops and starts related to one's life journey. The 1,200+ industry and education partners of the NJ Pathways to Career Opportunities initiative keep that in mind to coordinate and create on- and off- ramps that allow for the continuous movement along a pathway to industry credentials and college degrees.

Most students and adult learners have education and training pathways that look like this:



The pathways that are developed and enhanced in the Centers of Workforce Innovation are connected and lead to industry credentials and college degrees no matter the starts and stops along the way. Those pathways include:



The cross-education sector partners working with Community Colleges include 20 high schools, 9 four-year colleges and universities, 8 labor unions, and 4 community-based training providers and others engaged in this transformational work within the Centers. The Centers have connected and enhanced 22 education and training pathways in the four fastest-growing industries in the state. The pathways work will soon be available to the education institutions statewide via an online repository at www.njpathways.org. This work includes:

- » Model career awareness programs for high schools and Community Colleges
- » Model dual enrollment programs for high schools
- » Community College curriculum
- » Model articulation agreements between Community Colleges
- » Model articulation agreements with four-year colleges and universities
- » Prior learning assessment solutions for non-credit to credit (including for apprenticeships), industry credential to credit, and work experience to credit
- » Apprenticeship models
- » Model experiential learning programs
- » Contextualized adult literacy occupational programs
- » Model workforce development training programs
- » Pathway maps
- » Professional development materials for each pathway

The contents of this brochure represent the hard work of 1,200+ industry and education partners in the first full year of the pathways initiative. We have laid the groundwork, connected and enhanced education and training pathways, engaged industry to directly influence pathways, and created education ecosystems collaborating together while focused on industry needs to benefit employers, employees, adult learners and students.



TECHNOLOGY & INNOVATION

CENTER OF WORKFORCE INNOVATION FOR DATA SCIENCE

CENTER OF WORKFORCE INNOVATION FOR CYBERSECURITY

CENTER OF WORKFORCE INNOVATION FOR PROGRAMMING & SOFTWARE DEVELOPMENT

CENTER OF WORKFORCE INNOVATION FOR RESEARCH & DEVELOPMENT

INDUSTRY HIGHLIGHTS

- » **Projected to add 20,950 jobs through 2030**
- » **\$26.9 billion in total wages paid, or about 11.3% of all wages**
- » **GDP data is not available at the necessary level of NAICS detail**
- » **Added 4,100 new jobs since 1990**
- » **Loss of 6,100 jobs in Spring 2020 and has recovered 17,900 through May 2022**

Source: United States Bureau of Economic Analysis, GDP in Chained 2012 Dollars Quarterly Census of Employment and Wages, 2020 Annual Averages Current Employment Statistics

SALARY REPORT

EDUCATION	EMPLOYMENT	AVERAGE SALARY
Doctoral or professional degree	6,250	\$136,300
Master degree	750	\$116,900
Bachelor degree	123,540	\$129,600
Associate degree	9,360	\$70,300
Postsecondary non-degree award	2,730	\$66,600
Some college, no degree	7,560	57,100
High school diploma or equivalent	29,080	\$74,900
No formal educational credential	870	\$39,800

CENTER OF WORKFORCE INNOVATION FOR DATA SCIENCE

As more and more data drives all aspects of our lives and economy, data analytics and data science occupations have continued to experience high growth. Many businesses across all industries rely on employees who can analyze data to help them make better and more informed decisions. In addition, more and more employees across many occupations are expected to be able to collect, process, and analyze data.

PATHWAY 1 – DATA SCIENCE

CONNECTION TO HIGH SCHOOL (DUAL ENROLLMENT)

Camden County College created two dual enrollment courses worth 3 college credits entitled (1) Intro to Python Programming and (2) Intro to Data Science in partnership with West Deptford High School, Camden Catholic High School, and Camden County Technical School. These dual enrollment courses will be offered in the Fall of 2023.

Camden County College, County College of Morris, and Brookdale Community College created three dual enrollment courses for (1) Intro to Data Science and (2) Python Programming and (3) Statistics in partnership with Pennsauken High School, Morris County Vocational School, and St. John Vianney High School. Students completing these dual enrollment courses will receive 3 college credits for each course toward their Associate of Science and Associate of Applied Science in Data Science degree programs at their respective colleges.

High school students who complete the Python Programming course are prepared to sit for the Python Programming industry credential.

PRIOR LEARNING ASSESSMENT (OTHER)

Brookdale Community College (BCC), Camden County College (CCC), County College of Morris (CCM), and Middlesex College partnered to use prior learning assessments (PLA) to evaluate the following data science industry credentials for college credit:

- (1) Certified Entry-Level Python Programmer Certification (PCEP)
- (3) Alteryx Foundation Micro-Credentials, and
- (2) Google Data Analytics,
- (4) Alteryx Designer Core Certification

Students who successfully pass the professional certification examinations earn 3 college credits toward the following Data Science degree programs: Associate of Applied Science in Data Science at CCC, Associate of Science in Computer Science (Data Science Option) at CCM, and Associate of Science in Mathematics (Data Science Option) at BCC.

By awarding PLA credits, the number of courses that students must complete to attain their degree is reduced which has a significant impact on students' lives by decreasing the time to earn a degree and decreasing debt accumulation. Additionally, students are equipped with the necessary skills to enter the technology workforce.

CONNECTION TO 4-YEAR COLLEGES/UNIVERSITIES

County College of Morris partnered with Ramapo College to create an articulation agreement between their Data Science degree programs. The articulation agreement provides for Community College students graduating with Associate degrees in Mathematics, Computer Science, or Data Science to enter an accelerated program to pursue a Bachelor of Science and Master of Science degree in Data Science at Ramapo College.

This articulation agreement will ensure that students will not incur additional time nor expense repeating or duplicating course work and ensures students are equipped with the necessary skills to enter the technology workforce.

EXPERIENTIAL LEARNING

County College of Morris created 3 new internship credit courses for students that take part in Data Analytics Internships. The one credit course is for 45-100 hours, the two-credit course is for 90-200 hours, and the 135-300 hours course is for three credits. The 3 credit Internship Experience course is embedded in the Data Analytics Certificate.

Brookdale Community College enhanced an existing 1-3 credit Mathematics Internship course with experiential learning skills for its Data Science students. With these enhanced industry skills, Data Science students are prepared to enter the workplace with real world workplace experiences.

These industry focused internships prepare Data Science students to enter the workforce with real world workplace experiences.

ADULT LEARNERS

The County College of Morris created 2 non-credit certificates in Data Analytics and Data Visualization. The Data Analytics Certificate offers adult learners a five-course sequence where they learn Business Analytics, Visual Basic, R Statistical Programming and Tableau. The Data Visualization Certificate offers adult learners a four-course sequence where they learn Tableau and, by the end of the program, they will have the knowledge to sit for the Tableau Desktop Specialization credential exam and enter the workforce equipped with the necessary skills to enter the technology workforce.

Brookdale Community College is developing a course in Tableau to offer in their Continuing and Professional Studies (non-credit) division. Adult learners completing the Tableau course are prepared to sit for the Tableau Desktop Specialization credential exam.

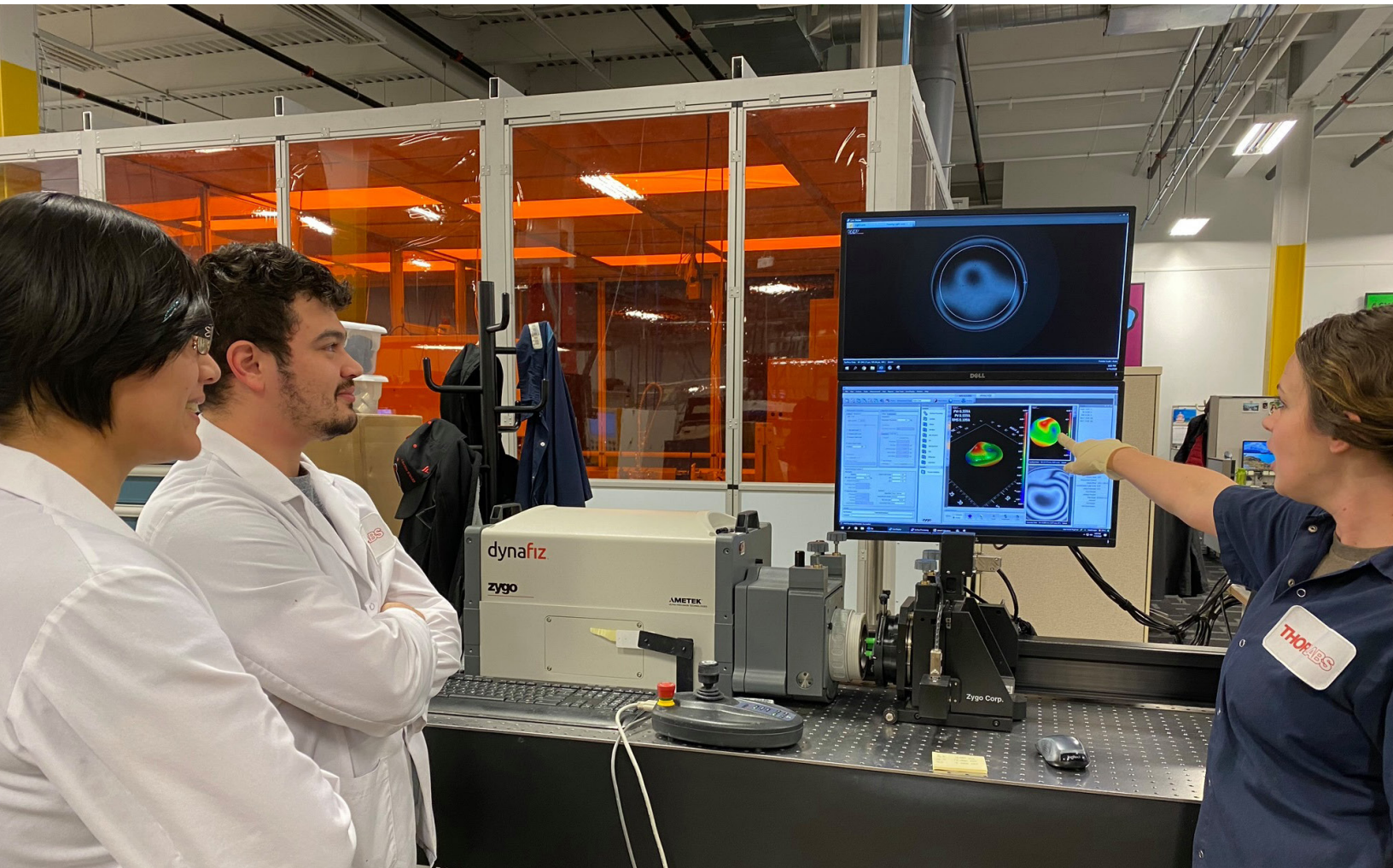
PROFESSIONAL DEVELOPMENT

Brookdale Community College (BCC), Camden County College (CCC), and County College of Morris (CCM) will serve as technical assistance providers and trainers to their own faculty and to other education institutions wanting to implement Data Science industry credential courses and programs. Faculty at these Community Colleges have completed or will complete Data Science Professional Development for PCEP, Tableau Desktop, Splunk, Alteryx, R Programming, Google, and IBM DS.

In an effort to disseminate lessons learned and promote the discipline of Data Science across the state, this Center participated in the Mathematics Assoc. of NJ's Two-Year Colleges (MATYCNJ) Fall conference on November 5th 2022 focused on the current state of Data Science education. The Center led a panel discussion on the Center of Workforce Innovation for Data Science initiative to transform and strengthen the links between education and the needs of employers in New Jersey. Luncheon information table sessions were also hosted as follows:

- Curriculum for an Introduction to Data Science Discussion Lead by Kelly Fitzpatrick (CCM)
- OER and Transfer Opportunities in Data Science-Discussion Lead by Sue Monroe (BCC)
- Technology used for Data Science-Discussion Lead by Tuan Le and Anita Wright (CCC)

As the Center created courses and curriculums are implemented, it will continue to discover, develop, and share useful OER (online educational resources) to improve content and delivery as well as provide support to new programs. Sample first-year course learning materials for an Intro to Data Science and Data Preparation have already been shared.



CENTER OF WORKFORCE INNOVATION FOR CYBERSECURITY

The COVID-19 pandemic accelerated our move into the virtual universe causing an increase in data breaches and cybercrimes. The significant move into the virtual universe has increased people's exposure of their personal identifying information and businesses' exposure to ransomware virus attacks. Businesses are increasingly in need of employees to ensure data integrity, retention, and availability for overall data protection.

PATHWAY 1 – CISCO® NETWORK FUNDAMENTALS

CONNECTION TO HIGH SCHOOL (DUAL ENROLLMENT)

Ocean County College partnered with the Camden Dream Center (a community-based training provider that is the state's Cisco Academy) to embed the Cisco industry credential of (1) Cisco Certified Network Associate and the CompTIA industry credentials (1) CompTIA A+, (2) CompTIA Networking+, and (3) CompTIA Security+ into existing Computer Science dual enrollment courses. Lakewood High School students earn 3 college credits per course. These courses prepare students to take the CISCO and CompTIA industry credential examinations which may afford them immediate employment.

Raritan Valley Community College (RVCC) developed a dual enrollment program with Hunterdon County Polytech High School and embedded the CompTIA industry credentials (1) CompTIA A+ and (2) CompTIA Network+ into existing dual enrollment courses. Students earn 3 college credits for each course toward the Associate of Applied Sciences in Computer Networking and Cybersecurity. These courses prepare student to take the CompTIA industry credentials examination which may afford them immediate employment.

PRIOR LEARNING ASSESSMENT

Ocean County College embedded the industry credentials curriculum for (1) Cisco Certified Network Associate, (2) CompTIA A+, (3) CompTIA Networking+, and (4) CompTIA Security+ into 3 courses that stack toward the Associate of Science in Computer Science (Cyber Information option) degree program. After completion of these courses (Computing Fundamentals, Cisco Networking Fundamentals, and Intro to Cybersecurity), students are prepared to take the industry credentials certifications examinations and are ready to enter the workforce.

Raritan Valley Community College developed a 60-college credit Associate of Applied Science in Cybersecurity degree program, 30-college credit Certificate in Cybersecurity program, and a 30-college credit Certificate of Computer Support program. Skills Based Assessment (SBA) documents were also created for the 10 technical courses in the AAS and two certificate programs. The SBAs are designed as Prior Learning Assessments for individuals that have prior experience or industry credential certifications in Cybersecurity.

CONNECTION TO 4-YEAR COLLEGES/UNIVERSITIES

Raritan Valley Community College (RVCC) partnered with Rowan University (RU) to create articulation agreements between their Cybersecurity degree programs. The following articulation agreements are under review pending final approvals:

- 3+1 articulation agreement for the Associate of Applied Science in Computer Networking/ Cybersecurity option degree program at RVCC and the Bachelor of Arts in Computing and Informatics with Cybersecurity concentration degree program at RU, and
- 2+2 articulation agreement for the Associate of Applied Science in Computer Networking / Cybersecurity option degree program at RVCC and the Bachelor of Arts in Computer Systems Technology degree program at RU.

Ocean County College (OCC) partnered with Rowan University (RU) to create articulation agreements between their Cybersecurity degree programs. The following articulation agreements are pending final approvals:

- 3+1 articulation agreement for the Associate of Computer Science with Cyber – Infor option degree program at OCC and the Bachelor of Arts in Computing and Informatics with Cybersecurity Concentration degree program at RU, and
- 2+2 articulation agreement for the Associate of Science in Computer Science with Cybersecurity option degree program at OCC and the Bachelor of Arts in Computer Systems Technology degree program at RU.

These agreements ensure that students will not incur additional time nor expenses repeating or duplicating course work that has already been completed.

EXPERIENTIAL LEARNING

Ocean County College will offer GenCyber Safe, a 5-day Summer Camp for middle and high school students which increases awareness about cybersecurity careers. GenCyber Safe builds a scaffolding of cybersecurity fundamental knowledge in a vibrant, fun, and peer-driven learning environment. GenCyber Safe introduces students to cyber technology through engaging learning activities that connect the basics of security information and related career pathways. This camp will be offered twice over Summer 2023, with an anticipated 30 students participating in each camp. GenCyber Safe has the potential to reach students across Ocean County.

ADULT LEARNERS

Ocean County College (OCC) created non-credit workforce training courses that embed curriculum for the following industry credentials: (1) Cisco Certified Network Associate, (2) Cisco Network Security, and (3) Cisco CyberOps Assoc. Adult learners who complete the courses will be prepared to sit for the credential examinations and enter the workforce equipped with the necessary skills to enter the technology workforce. OCC will give college credit to adult learners who earn the industry certifications toward the Associate of Science degree program.

Raritan Valley Community College created non-credit workforce development training courses that embed curriculum for the following industry credentials: (1) Cisco A+, (2) Cisco Certified Network Associate, and (3) Google IT certificates. Adult learners who complete the courses will be prepared to sit for the credential examinations and enter the workforce equipped with the necessary skills to enter the technology workforce.

PROFESSIONAL DEVELOPMENT

In developing professional development resources, a Raritan Valley Community College instructor was trained on the new Cisco CyberOps Associate certificate course. The two-week industry credential training course was compressed and completed in August 2022. Videos were generated so that other education professors can use them to learn the course material.

Ocean County College (OCC) partnered with the Camden Dream Center (a Cisco Networking Training Academy) for Train-the-Trainer for CyberOps and Cisco Certified Network Associate. OCC had faculty complete these courses so that they may provide professional development on these courses for other OCC faculty and other education institutions.

Rowan College at Burlington County (RCBC) has faculty who have completed cybersecurity industry credentials training for CyberOps and Instructor Training for Cisco Certified Network Associate. These faculty may provide professional development on these courses for other RCBC faculty and other education institutions.

NJ-NEST Northern New Jersey STEM Ecosystem at Bergen Community College held professional development sessions during 2022 and has scheduled several campus events and programs to host more professional development information sessions at several campus outlets in Spring/Summer 2023.

PATHWAY 2 – COMPTIA NETWORK FUNDAMENTALS

CONNECTION TO HIGH SCHOOL (DUAL ENROLLMENT)

Camden County College (CCC) embedded the following CompTIA industry credentials: (1) CompTIA A+, (2) CompTIA Network+, (3) CompTIA Security+, and (4) CompTIA CySA+ certifications into existing dual enrollment courses at Collingswood High School. Upon completion of the dual enrollment courses, students will be prepared to sit for the CompTIA industry credentials examinations and join the workforce. Students who earn the industry certifications may also receive college credit toward the Associate of Applied Science in Cybersecurity degree program.

PRIOR LEARNING ASSESSMENT

Camden County College (CCC) embedded CompTIA industry credentials into existing Cybersecurity courses at CCC. Students who have completed the CompTIA A+, Network+, Security+, and CySA+ and Microsoft Windows Server 2019 Administration certifications will receive credit for the associated course at CCC. Correspondingly, students who complete their academic courses will be prepared to sit for the CompTIA certification exam and become employed in the workforce certifications.

CCC has convened an institution-wide task force to define and determine prior learning assessment pathways at the college. CompTIA, Microsoft, and Cisco certifications and their relationship to credit classes will be further defined during this process.

Rowan College at Burlington County developed a Prior Learning Assessment (PLA) Toolkit to assist colleges with the noncredit to credit evaluation and or portfolio review options of PLA. The layout for this toolkit is based on the “phases of implementing a project,” planning, developing, implementing and launching. In each stage, there is a brief descriptor of the process, important questions for consideration, and sample documents, challenges and questions.



CONNECTION TO 4-YEAR COLLEGES/UNIVERSITIES

Camden County College (CCC) partnered with Rowan University to create articulation agreements between their Cybersecurity degree programs. The following articulation agreements are pending final approvals:

- 3+1 articulation agreement for the Associate of Applied Science in Cybersecurity degree program at CCC and the Bachelor of Arts in Computing and Informatics (Cybersecurity concentration) degree program at Rowan University, and
- 2+2 articulation agreement for the Associate of Applied Science in Cybersecurity degree program at CCC and the Bachelor of Arts in Computing and Informatics (Cybersecurity concentration) degree program at Rowan University.

Rowan College at Burlington County (RCBC) partnered with Rowan University to create an articulation agreement between their Cybersecurity degree programs. The articulation agreement for the Associate of Applied Science in Cybersecurity degree program at RCBC and the Bachelor of Arts in Computer Systems Technology degree program at Rowan is pending final approval.

These agreements ensure that students will not incur additional time nor expenses repeating or duplicating course work that has already been completed.

EXPERIENTIAL LEARNING

Raritan Valley Community College partnered with Hunterdon Central High School to create and pilot a 3-week Summer Program that allows high school students to earn 3 college credits toward the Cybersecurity degree program and have the opportunity to sit for the CompTIA A+ certification examination. The program will be offered Summer 2023.

Rowan College at Burlington County created an Experiential Learning Guide for developing or expanding on current experiential learning programs and can be used in its current format or adapted for an institution's unique conditions. Considerations may include program-specific accreditation requirements, institutional priorities, funding access and opportunities, student population (trends/needs), and industry presence in the region. The Guide includes experiential learning definitions, student and supervisor evaluations, employer engagement strategies, experiential learning participation and partnership agreements, experiential learning proposal process, and experiential learning course.

ADULT LEARNERS

Camden County College (CCC) created a non-credit workforce development training course that embeds curriculum for CompTIA industry credentials. As a CompTIA Approved Training Academy, CCC includes the curriculum for core elements of the industry credential certifications for (1) CompTIA A+ (Computer Repair), (2) CompTIA NET+, and (3) CompTIA SEC+.

The course, Computer Technology Support Specialist, prepares adult learners who complete the course to sit for the credential examinations and enter the workforce equipped with the necessary skills to enter the technology workforce. Adult learners who earn the industry certifications can also receive college credit toward the Associate of Applied Science in Cybersecurity degree program.

PROFESSIONAL DEVELOPMENT

Camden County College (CCC) is offering both credit and non-credit instructors the opportunity to take the CompTIA Data+ course and sit for this industry credential certification examination. Credentialed Instructors will provide training for other instructors. CCC is also planning a Cybersecurity Professional Development event to be held at the Rohrer Center in Cherry Hill for Spring 2023.

CENTER OF WORKFORCE INNOVATION FOR PROGRAMMING & SOFTWARE DEVELOPMENT

Software Development and Programming occupations employ more than 240,000 people in New Jersey, and these occupations continue to show steady growth. These occupations are found in many industries as new, smarter, and faster automated processes are driving technological improvements in many other industry sectors including manufacturing, supply chain, logistics, and health technology.

PATHWAY 1 – COMPUTER SCIENCE

CONNECTION TO HIGH SCHOOL (DUAL ENROLLMENT)

Essex County College partnered with Essex County Schools of Technology to create computer science dual enrollment pathway from high school to Community College. Students can take dual enrollment courses embedded with stackable CompTIA industry credentials including professional certifications for: (1) IT Fundamentals, (2) A+ Core I, and (3) A+ Core II. Students who successfully complete the courses and pass the professional certification examinations earn 7 college credits toward the Associate of Science in Computer Science degree program.

Middlesex College partnered with Thomas Edison EnergySmart Charter School to create a computer science dual enrollment pathway from high school to Community College. Students can take dual enrollment courses with stackable CompTIA industry credentials including professional certifications for: (1) CompTIA A+, (2) CompTIA Security +, and (3) Java SE 8 Oracle Certified Associate. Students who successfully complete the courses and pass the professional certification examinations earn 4 college credits at MC toward the Associate of Science in Computer Science degree program.

PRIOR LEARNING ASSESSMENT (OTHER)

Essex County College (ECC) reviewed 3 CompTIA industry credentials and evaluated each for college credit. The industry credentials are the following certifications: (1) IT Fundamentals ITF+, (2) A+ Core I, and (3) A+ Core II. Students who successfully attain these industry credentials by passing all corresponding professional examinations earn 7 college credits toward 2 courses mapped to 4 degree programs and 2 academic certificate programs at ECC. With these stackable industry credentials, students earn college credits toward academic certificate and degree programs and are equipped with the necessary skills to enter the technology workforce.

Middlesex College (MC) reviewed 3 CompTIA industry credentials, evaluated each for college credit, and embedded them into existing MC courses. The industry credentials are the following certifications: (1) CompTIA Network+, (2) CompTIA Security+, and (3) Oracle Java SE 8 Certified Associate. Faculty mapped course topics and skills to the professional examinations for the industry credentials and revised college courses to better align with the industry certification content.

Students who successfully attain these industry credentials by passing all corresponding professional examinations earn 3 or 4 college credits toward an Associate of Science in Computer Science degree program at MC. With these stackable industry credentials, students earn college credits toward a degree and are equipped with the necessary skills to enter the technology workforce.

DEGREE/CERTIFICATE	MAJOR COUSE REQUIREMENT	ADDITIONAL COURSE REQUIREMENT
Computer Science AS (2302)	CSC 104	
Computer Network Support-Certificate (3321)	CSC 114	
Cybersecurity & Network Technology AAS (2312)	CSC 104 and CSC 114	
Cybersecurity - Certificate (3322)	CSC 114	
Health Information and Technology AAS (2124)		CSC 104
Software Development Technology AAS (2316)	CSC 104	CSC 114



CONNECTION TO 4-YEAR COLLEGES/UNIVERSITIES

Essex County College (ECC) partnered with Rowan University to create articulation agreements between their Computer Science degree programs. The following articulation agreements are pending final approvals:

- 3+1 articulation agreement for the Associate of Science in Computer Science degree program at ECC and the Bachelor of Arts in Computing and Informatics degree program at Rowan University, and
- 2+2 articulation agreement for the Associate of Science in Computer Science degree program at ECC and the Bachelor of Science in Computer Science degree program at Rowan University.

Middlesex College (MC) partnered with Rowan University to create articulation agreements between their Computer Science degree programs. The following articulation agreements are pending final approvals:

- 3+1 articulation agreement for the Associate of Applied Science in Computer Science degree program at MC and the Bachelor of Arts in Computing and Informatics degree program at Rowan University, and
- 2+2 articulation agreement for the Associate of Science in Computer Science degree program at MC and the Bachelor of Science in Computer Science degree program at Rowan University.

These articulation agreements will ensure that students will not incur additional time nor expense repeating or duplicating course work.

ADULT LEARNERS/PILOT

Essex County College (ECC) partnered with the Camden Dream Center (NJ's Cisco Networking Academy), to offer non-credit workforce training courses to adult learners. These courses are: (1) CCNA – Introduction to Networking and (2) Introduction to Cybersecurity. The courses will be offered in Fall 2023.

Adult learners who successfully complete one or both courses are on the pathway to be equipped with the necessary skills to enter the technology workforce.

Middlesex College developed 5 new non-credit workforce training courses that prepare adult learners for the corresponding CompTIA certifications professional examinations. These courses are 40 hours each and will be offered in Spring 2023.

The courses are for the following CompTIA industry certifications: (1) CompTIA+ Hardware, (2) CompTIA+ Software, (3) CompTIA Network+, (4) CompTIA Security+, and (5) CompTIA Cloud+.

Adult learners who complete one or more of these courses and pass the professional certification examinations will have stackable industry credentials and are equipped with the necessary skills to enter the technology workforce.

PROFESSIONAL DEVELOPMENT

Middlesex College developed student preparation content including mock professional certification examinations for industry credentials for the following professional certifications: (1) Oracle Java SE 8 Certified Associate, (2) CompTIA Network+, and (3) CompTIA Security+.

Middlesex College will provide these training and professional development resources for courses preparing students and adult learners for these industry credentials to other NJ education institutions interested in offering these courses. Additionally, Middlesex College will make adjunct and faculty holding industry certifications available as professional development resources to other NJ education institutions.

PATHWAY 2 – COMPUTER SYSTEMS TECHNOLOGY

CONNECTION TO HIGH SCHOOL (NON-CREDIT)

Ocean County College partnered with Lakewood High School for its dual enrollment program. Lakewood HS will select 25 rising eighth grade students with overall GPAs between 1.85 and 2.4 to participate in the Lakewood Academy. Students will take courses embedded with stackable the following industry credentials: (1) CompTIA industry certification, (2) CompTIA A+ certification, and (3) CompTIA Security A+ certification.

The goal of the program is to assist participating students to earn a High School diploma, an Associates degree from OCC, and a Bachelor's degree while earning stackable industry credentials which equip them with the necessary skills to enter the technology workforce.

CONNECTION TO HIGH SCHOOL (DUAL ENROLLMENT)

Essex County College (ECC) partnered with Essex County Schools of Technology to create computer science a dual enrollment pathway from high school to Community College. Students can take dual enrollment courses embedded with stackable CompTIA industry credentials including professional certifications for: (1) IT Fundamentals, (2) A+ Core I, and (3) A+ Core II. Students who successfully complete the courses and pass the professional certification examinations earn 7 college credits toward the Associate of Science in Computer Systems Technology degree program.

Middlesex College partnered with Thomas Edison EnergySmart Charter School to create a computer science dual enrollment pathway from high school to Community College. Students can take dual enrollment courses with stackable CompTIA industry credentials including professional certifications for: (1) CompTIA A+, (2) CompTIA Security +, and (3) Java SE 8 Oracle Certified Associate. Students who successfully complete the courses and pass the professional certification examinations earn 4 college credits at Middlesex College toward the Associate of Science in Computer Systems Technology degree program.

CONNECTION TO COMMUNITY COLLEGE (CREDIT)

Ocean County College embedded three (3) courses with the following industry credentials: (1) CompTIA A+, (2) CompTIA Network +, and (3) Amazon Web Services (AWS) into the Associate of Science in Computer Science degree program. Students who successfully attain these industry credentials by passing all corresponding professional examinations earn up to 10 college credits. With these industry stackable credentials, students earn college credits toward a degree and are equipped with the necessary skills to enter the technology workforce.

Ocean County College updated credit curriculum to ensure all content and skills are embedded in credit sequence. The pilot for industry valued credential examinations course preparation will be offered Spring 2023. OCC will hold two information sessions with Computer Sciences majors in their 3rd and 4th semesters highlighting opportunities to take industry certification examinations. Students who successfully complete industry enhanced courses are equipped with the necessary skills to enter the technology workforce.

Essex County College reviewed and embedded three CompTIA curricula (IT Fundamentals ITF+, A+ Core I & II) industry credentials into the Associate of Science in Computer Science degree program. Students who successfully complete and document content competencies through CompTIA stackable industry certifications in all three (3) curricula (ITF+, A+ Core I & II), are eligible for seven (7) Essex County College credits. With these industry stackable credentials, students are ready to enter the workforce.

CONNECTION TO 4-YEAR COLLEGES/UNIVERSITIES

Essex County College (ECC) partnered with Rowan University to create articulation agreements between their Computer Systems Technology degree programs. The following articulation agreement is pending final approval:

- 2+2 articulation agreement for the Associate of Applied Science in Cybersecurity and Networking degree program at ECC and the Bachelor of Arts in Computer Systems Technology degree program at Rowan University.

Ocean County College (OCC) partnered with Rowan University to create articulation agreements between their Computer Systems Technology degree programs. The following articulation agreements are pending final approvals:

- 2+2 articulation agreement for the Associate of Applied Science in Computer Science and Information Technology degree program at OCC and the Bachelor of Arts in Computer Systems Technology degree program at Rowan University.
- 2+2 articulation agreement for the Associate of Applied Science in Computer Science and Information Technology degree program at OCC with the Bachelor of Arts in Computer Systems Technology degree program at Rowan University.

These articulation agreements will ensure that students will not incur additional time nor expense repeating or duplicating course work.

ADULT LEARNERS

Ocean County College developed new non-credit workforce training courses that prepare adult learners for corresponding CompTIA certifications professional examinations. These courses will be offered in Summer 2023.

The courses are for the following CompTIA industry certifications: (1) CompTIA A+, (2) CompTIA IT Fundamentals, and (3) CompTIA Network.

Adult learners who complete one or more of these courses and pass the professional certification examinations will have stackable industry credentials and are equipped with the necessary skills to enter the technology workforce.

ADULT LEARNERS/PILOT

Ocean County College created a pilot for a cohort of 24 adult learners for non-credit workforce training courses utilizing the Google IT Certifications courses on Coursera. The courses are: (1) Google Project Management, (2) UX Design, (3) IT Automation with Python Digital Marketing & E-Commerce, and (4) Google Data Analytics.

Adult learners who successfully complete one or more of these courses and pass the professional certification examinations will have stackable industry credentials, earn 12 college credits toward the Associate of Science in Computer Science and Information Technology and degree programs, and are equipped with the necessary skills to enter the technology workforce.

PROFESSIONAL DEVELOPMENT

Ocean County College (OCC) hosted a professional development session to inform other education professionals and institutions how to evaluate and map competencies and skills of industry valued credentials to embed them into college credit courses. OCC will share all developed and approved curriculum with other education institutions in Spring 2023.



CENTER OF WORKFORCE INNOVATION FOR RESEARCH & DEVELOPMENT

New Jersey is home to a vibrant research and development economy that spans a variety of industries, including biotech, life sciences, artificial intelligence, unmanned aerial systems, renewable energy, clean technologies... To retain and grow its role in scientific and technological invention, the state will need skilled workers at all levels from PhD level scientists to research technicians and support employees.

PATHWAY 1 – BIOMANUFACTURING/BIOPHARMACEUTICAL/PROCESS TECHNOLOGY

CONNECTION TO HIGH SCHOOL (NON-CREDIT)

Middlesex College developed a Summer Exploration Program ("Pathways to Biotechnology") for high school students who are interested in biotechnology (encompassing biomanufacturing and biopharmaceuticals). The program is intended to increase high school students' awareness of careers and opportunities in the Biomanufacturing sector, specifically to acquaint them with careers in Biotechnology, Biopharmaceutical, and Process Technology. This summer exploration program is an onramp for students who are or may become interested in pursuing an Associate of Applied Science in Process Technology or Associate of Science in Biotechnology.

High school students who have completed a year of biology and a year of chemistry are eligible for the program. Marketing materials (including fliers advertising this program) were disseminated to Middlesex County high schools in early February 2023. The program will run from June 26, 2023 through Aug 3, 2023. Sixteen students will be chosen by lottery to participate.

Middlesex College created an Implementation Guide with program objectives/learning outcomes and a lab manual containing all of the relevant lab exercises. Introductions to all of the lab exercises, lecture presentation materials, the lab protocols, as well as suggestions for outside speakers and/or activities are made available for other education institutions to replicate this program.

ADULT LEARNERS

Middlesex College is in the process of creating a non-credit workforce development training course (Aseptic Technique) to serve as the first course in a sequence of courses that ultimately will stack (for credit) into the Associate of Applied Science in Process Technology or Associate of Science in Biotechnology degree programs. (MC is considering college credit evaluation / prior learning assessment simultaneously as these non-credit courses are under development.)

The Aseptic Technique course will consist of competencies required as a foundation for all other laboratory techniques in this industry. The Aseptic Course will be completed by early Summer 2023 and will run in late Summer or early Fall 2023.

Following the completion of the Aseptic Technique course, Middlesex College will move on to the development of additional non-credit, stackable courses. Ultimately, the stackable curriculum is envisioned as follows: (1) Aseptic Technique Certificate, (2) Essentials of Biomanufacturing Certificate, (3) Cell and Gene Therapy Technician Certificate, and (4) Protein Expression Technician Certificate. An additional capstone course (Advanced Biomanufacturing) is being considered to round out the curriculum culminating into the industry credential of the Biomanufacturing Process Technician Certificate.

Based on discussions with industry partners, students completing this industry focused curriculum will be prepared to enter the workforce with the requisite skills to be productive contributors.

PATHWAY 2 – RESEARCH & DEVELOPMENT

CONNECTION TO HIGH SCHOOL (NON-CREDIT)

Bergen Community College conducted several career awareness events/programs for high-school and middle-school participants to raise awareness and develop an interest in Research and Development careers in general and the BCC research program in particular. The STEM Research Exploration series was established to promote interest in research-driven learning, with targeted workshops for high-school and middle-school students on college research and related careers.

These programs included R&D Pathway Kickoff sessions, STEM Research Exploration Series at Applied Tech High School and STEM C^2 Research Summit series (rescheduled for October 6, 2023). The STEM Research Awareness programs ran through 2022 and continue through Spring 2023.

CONNECTION TO COMMUNITY COLLEGE (NON-CREDIT)

Bergen Community College identified several non-credit, mini-courses as potential courses for badge-bearing learning experiences for Basic Science Research Methods and Applied Science Research Methods.

The courses included: (1) Speech Coaching for STEM Presentations, (2) Technical Writing for Scientific Publications, (3) Project Management for STEM Academic Research, (4) Applied Statistical Computing (R Language) and Experimental Research Design, (5) Introduction to Artificial Intelligence (AI), and (6) Introduction to Soldering and Microcontrollers

The Research and Development Pathway team has started evaluating the above-mentioned mini-courses and aligning them to the corresponding industry badges/credentials. The review process should be completed in May 2023. Additional courses may be considered.

EXPERIENTIAL LEARNING/PILOT

Bergen Community College embedded research-based learning, experiential learning opportunities stackable into the Associate of Science degrees in Biology, Biotechnology, and Chemistry.

The experiential learning opportunities are as follows: (1) Microbial Mechanisms of Pathogenicity was embedded in the Microbiology course, (2) Aero Microbiology was embedded in the Environmental Microbiology course, (3) Antibiotic Sensitivity Testing was embedded in the Microbiology course, and (4) Nanoparticles lab was added to the General Chemistry lab course.

A total of 143 students enrolled in these courses during Fall 2022 benefited from the newly developed research-based, experiential learning opportunities thus improving their R&D skills in preparation for the students' entry into the workforce.

EXPERIENTIAL LEARNING/PILOT

Bergen Community College embedded research-based learning, experiential learning opportunities into general science courses.

The experiential learning opportunities are as follows: (1) hands-on lab added to the Embryology course, (2) hands-on lab added to the Botany course, and (3) applied research project added to the Principles of Ecology course.

A total of 67 students enrolled in these courses during Fall 2022 benefited from the newly developed research-based, experiential learning opportunities thus improving their R&D skills in preparation for the students' entry into the workforce.





Cisco is proud to partner with NJ Pathways. As Cisco moves from degree based to skill based hiring, NJ Pathways helps ensure students are attaining industry credentials which make them well qualified candidates for workforce needs within the technology sector and other sectors that are increasingly relying on technology to meet their business needs.

Rebecca Chisolm
Senior Leader, Network Academy North America
Cisco Corporate





NJ PATHWAYS **TO CAREER OPPORTUNITIES**

We hope our brochure on the New Jersey Pathways to Career Opportunities' Centers of Workforce Innovation gave you insights and appreciation for the game-changing work we are doing to align education with industry in the Garden State! It is exactly what is necessary to propel New Jersey's economy post-pandemic and beyond.

New Jersey Pathways embraces high-quality and timely labor market information about the changing needs of employers and builds an ecosystem of education and training partners to encourage collaboration and information sharing. We are confident this coordination and expansion of partnerships between critical stakeholders - in such a comprehensive fashion - will make unprecedented strides in advancing careers and filling critical employment needs.

This dynamic, cutting-edge initiative would not be possible without the vast industry and educational connections that have been built over several decades by New Jersey's Community Colleges and the New Jersey Business & Industry Association (NJBIA).

Community Colleges are one of New Jersey's greatest success stories. Created in the 1960s, New Jersey's 18 Community Colleges now enroll more than 300,000 people each year in credit, non-credit, and workforce development courses at more than 70 campuses throughout the state.

NJBIA has been focused on the advancement of competitive excellence for more than 110 years. NJBIA is the voice of thousands of businesses bound together for support, advocacy, and networking.

Together, New Jersey Community Colleges and NJBIA are a catalyst for progress and change sharpening our state's workforce. The synergy we have established with thousands of partners around the state is nothing shy of transformational.

We look forward to embracing you into this partnership.

AARON R. FICHTNER, PH.D.
President
New Jersey Council of County Colleges



MICHELE SIEKERKA
President and CEO
New Jersey Business & Industry Association





GET INVOLVED



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