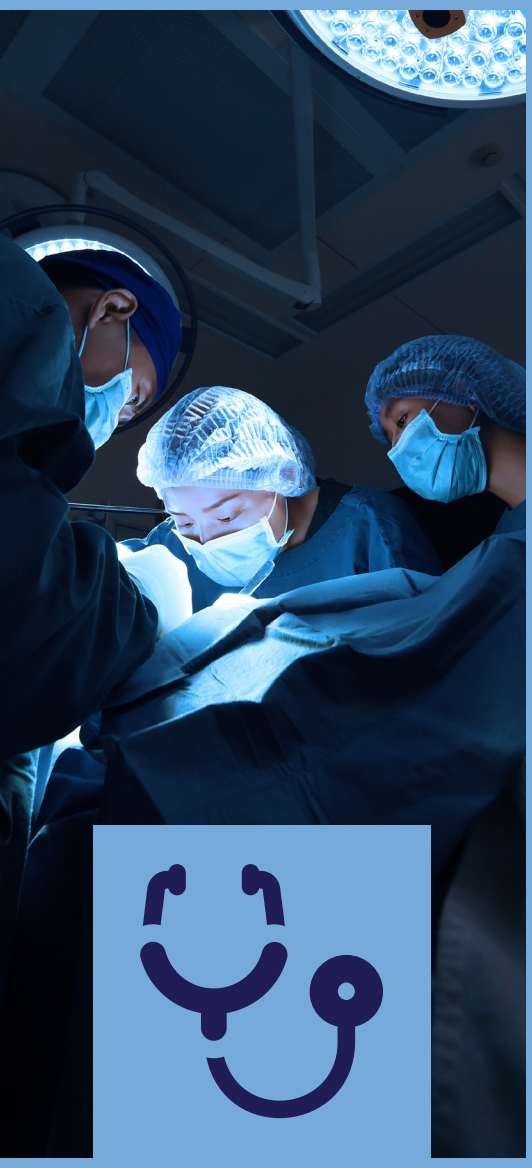
# MAPPING A PATH
## from High School to Success
### IN NURSING, CYBERSECURITY, AND MECHATRONICS



Accelerate ED

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ESG Education Strategy Group

# INTRODUCTION

In communities across the nation, high schools, colleges, employers, and community partners are working together to map pathways that provide a direct route to good jobs and future career advancement. Within an accelerated pathway, students take part in career-relevant course sequences that begin in high school, integrate early college courses and work-based learning, and lead to high-value degrees and credentials. These pathways enable students to explore interests, gain relevant knowledge and skills, and build momentum to prosperous, in-demand careers.

This resource seeks to provide schools, colleges, and intermediary organizations with insights into co-creating local programs of study that meet industry needs, and share examples of how communities have designed accelerated course sequences in high-demand industry sectors.

In many states, Healthcare, Information Technology, and Advanced Manufacturing currently have sizable labor market demands for a range of high-wage, high-growth occupations. This brief examines one pathway within each of these sectors: Nursing, Cybersecurity, and Mechatronics. While pathway maps are common at community colleges, extending these maps to include the high school on-ramp is less common, and intermediaries developing accelerated pathways are eager for examples and guidance. Within these three pathways, we examined over 25 course maps that include dual enrollment to explore the following questions:

- Which credentials and program outcomes are each of these pathways commonly designed to help students earn? What common foundational college courses lead to these credentials?
- What consistencies and differences do we see across and within these three pathways? To what extent can communities look to others' work for a roadmap to replicate these pathways, versus rooting their design in the nuances of their local community and economy?

**Our research identified and analyzed 8-10 exemplar course pathway maps** that span high school and college in each of Nursing, Mechatronics, and Cybersecurity, culled from a larger list compiled from a diversity of sources including state and local education agencies, intermediary organizations, traditional high schools, career and technical centers, early and middle colleges, P-TECH high schools, and colleges.

## Examples of How Pathway Maps Describe Their Program of Study

**NURSING** is a profession within the healthcare sector focused on providing care, support, and assistance to individuals, families, and communities to promote and maintain their overall health and well-being. Nurses play a crucial role in various healthcare settings, including hospitals, clinics, nursing homes, schools, home care, and more. To pursue a career in the Nursing field, individuals need to complete Nursing education or training programs, which can range from certification programs to Associate, Bachelor's, or even Master's degrees in Nursing.

*Source: Hawai'i Career Pathways Nursing Map to Employment*

**CYBERSECURITY** involves protecting private information—bank accounts, sensitive communications, medical histories—from falling into the wrong hands through malicious system threats (such as viruses, malware, threats, and scams) and internal vulnerabilities. This diverse, fast-growing field offers a range of career options, with specialties like threat analysis, cryptography, or network design to pique the interests of a range of students.

*Source: Greater Washington Partnership Cybersecurity Pathway*

**MECHATRONICS** is a diverse field. It encompasses many inter-related disciplines including Electronics, Mechanics, Fluid Power, Electrical Control Systems, Programmable Logic Controllers (PLC), Computers, and Robotics. Mechatronics is a term which includes the above disciplines and takes an integrated approach to their study. People employed in the Mechatronics field deal with automated systems in a wide variety of applications. They also deal with related professional and technical support activities such as production planning and control, maintenance, and engineering.

*Source: Georgia Mechatronics Program of Study*

## What we found:

- **Most pathways we examined include clear outcomes and postsecondary stackability.** In our scan for exemplar course maps, we prioritized those that include a full high school experience, early college course-taking culminating in a degree or credential of value, and integrated work-based learning experiences—though such comprehensive pathways were the exception rather than the norm. Most of our examples explicitly reference a particular program outcome (e.g., an industry-based credential) and applicability beyond high school and a first credentia—such as a technical certificate issued by a college, an Associate degree, a Bachelor's degree, or direct employment.
- **Course sequences are largely uniform in Nursing, compared to less regulated sectors.** Foundational course sequences in Nursing are relatively consistent, which reflects the highly regulated nature of the healthcare industry and Nursing occupations. In contrast, Cybersecurity and Mechatronics pathways have wider variation in both course sequences and outcomes. The evolving nature of the Information Technology (IT) field means that curriculum, degree requirements, and industry expectations for skill sets of job candidates can change quickly in Cybersecurity. Mechatronics appears the most highly customized to the regional economy, with pathways leading toward a range of degrees and credentials recognized by local manufacturing employers.

- **Course maps benefit from clarity and messaging about advantages for students.** The quality and clarity of pathway maps as a family-facing communications tool varies greatly. Some pathway maps consist of clear visuals that depict student progress through a pathway, including on- and off-ramps, while others are confusing/complex or do not offer visuals at all. Course prerequisites are explicit in some maps and unspecified in others. How credits earned in the programs apply toward high school degree requirements and future college degrees is not always clear, nor is what grade students are required to earn to get college credit. Some maps, especially in Mechatronics, contain extensive detail and context about the field, while Cybersecurity maps often message the occupation's importance to society. And while a number of maps connect the pathways to career options and salary information, fewer explicitly communicate the potential time and money students save through acceleration and dual enrollment.
- **Local context is a strong determinant of course delivery and scheduling.** Dual enrollment and career/technical courses are offered in a variety of ways across all three pathways: at a high school, at a technical center, on a college campus, and virtually. Some schools double-block time for pathway courses, while others leverage summers for courses or work-based learning. A few course maps explicitly reference transportation. In some maps, the dual enrollment courses included on the maps are based on statewide higher education certificate or degree pathways, leaving the details of the sequencing and delivery up to local scheduling requirements. In many cases, dual enrollment leads to a particular institution, and local agreements between individual schools, colleges, and unions create opportunities or barriers for course delivery. Local agreements and state policies also affect the ability of students to utilize the college credits they earn in high school if they continue studies at a different college or university.
- **Student eligibility poses implications for equity.** Some pathways set age (e.g., 16) or grade-level (e.g. juniors and seniors) requirements for taking part in pathway coursework, while others make career/technical and/or dual credit courses available in grade 9 and include recommendations for 8th grade courses. In other cases, pathway maps pose minimum grade point average requirements to apply for a particular program or school. Partners mapping pathways should examine why such requirements exist and who is imposing them, implications on equity and participation, and possible alternative routes to eligibility.

This table summarizes common outcomes, short-term credentials, and first college courses that we identified in over two dozen Nursing, Cybersecurity, and Mechatronics course pathway maps from communities across the nation.

| | NURSING | CYBERSECURITY | MECHATRONICS |
|---|---|---|---|
| **EXAMPLE PROGRAM OUTCOMES** | ▢ Associate Degree in Nursing<br>▢ Associate of Science<br>▢ Progress toward Bachelor of Science in Nursing | ▢ Associate of Applied Science in Cybersecurity<br>▢ Progress toward Bachelor of Science or Bachelor of Applied Science - Cybersecurity | ▢ AAS in Mechatronics<br>▢ AAS in Industrial Systems Technology<br>▢ Progress toward Bachelor of Science |
| **MIDPOINT CERTIFICATES AND INDUSTRY CREDENTIALS** | ▢ Licensed Practical Nurse or Licensed Vocational Nurse<br>▢ Emergency Medical Responder<br>▢ Certified Clinical Medical Assistant<br>▢ Certified Phlebotomist<br>▢ Electrocardiogram Technician<br>▢ Patient Care Technician<br>▢ Certified Nurse Aide or State-Tested Nurse Aide | ▢ CompTIA certifications (Networking, IT Fundamentals, Security) | ▢ Siemens Level 1 certification<br>▢ FANUC robotic Material Handling Tool and Programming Level 1 Certification<br>▢ Solidworks CSWA certification<br>▢ Precision Measurement Instruments (PMI) certifications<br>▢ Yaskawa Robotics Certifications<br>▢ NOCTI Mechatronics Level 1 |
| **COMMON FOUNDATIONAL COLLEGE COURSES** | ▢ Principles of Health Science<br>▢ Medical Terminology<br>▢ Anatomy and Physiology I<br>▢ Microbiology | ▢ Principles of Computing<br>▢ Foundations of Cybersecurity<br>▢ Intro to Computer Systems<br>▢ Foundations of Programming | ▢ Intro to Mechatronics<br>▢ Engineering Design<br>▢ Direct Current Circuits<br>▢ Mechanical Systems I<br>▢ Concepts of Electronics I |

# Pathway Mapping at Statewide Scale: EdSystems Model Programs of Study Guides

States and intermediary organizations can play an important role in creating a set of tools for high-quality pathway mapping that can be adapted at the local level. To support pathway mapping across Illinois, Education Systems Center at NIU (EdSystems) developed the Model Programs of Study Guides in 10 industry areas. Sponsored by the Illinois Community College Board, the guides provide exemplars for localities to adopt or customize. For each industry area, they identify foundational dual enrollment courses that are well situated for statewide scaling, define the competencies that should be sequenced across a program of study, and identify entry points for employers to support coursework and work-based learning. EdSystems used a six-month backward mapping process that starts with areas of job growth and extends down through the high school course sequence:

1. Identify high-skill, high-wage, in-demand occupations in the industry sector using federal Department of Labor data for the State of Illinois
2. Identify promising credentials (degrees or certificates) leading to these occupations that are broadly accessible through the Illinois community college system
3. Map the stackable degrees or certificates that progress to promising credentials
4. Identify community college courses that appear across the maximum number of promising credentials, provide a broad foundation of knowledge essential to the industry sector, and are feasible for dual enrollment delivery
5. Map a course sequence from high school through the first year of postsecondary that incorporates strategic early college courses (at least six college credit-hours in the career-focused course sequence) and considers industry trends in career and technical education
6. Define related technical competencies for the foundational program of study courses that can be used to guide course development and postsecondary articulation

EdSystems works directly with districts to support the adaptation in certain fields, and has also developed a process for periodically updating the guides with new labor market information, as well as studying how colleges and their high school partners are utilizing and implementing them.

# NURSING

At the Nursing & Healthcare Early College High School (H-TECH) at Fox Tech High School in San Antonio, students can earn an Associate of Science degree at San Antonio College upon high school graduation, accelerating their path to a medical career. Students begin dual enrollment in 9th grade and take key Nursing pathway courses such as Anatomy and Physiology in 11th grade. Completing the prerequisite of college Chemistry in 11th grade enables them to take Microbiology for Nursing as seniors. H-TECH, a nonselective, open enrollment school, allows students to choose a 6-year Registered Nursing track in which they spend Years 5 and 6 completing courses to sit for the licensure exam to become Registered Nurses. Along the way, students can earn industry certifications such as Patient Care Technician, Certified Phlebotomist, Electrocardiogram Technician, or Pharmacy Technician—enabling them to work in the sector while finishing their Associate or Bachelor's degrees.

In greater New Orleans, the Fast Forward Nursing Apprenticeship pathway is designed to allow students to gain health career knowledge, take college courses at Delgado Community College, and experience work-based learning with Ochsner Health, a regional healthcare system. Students take 10th grade high school career/technical courses such as Intro to Healthcare Occupations and Medical Terminology to complete prerequisites in order to begin dual enrollment in 11th grade—including Human Anatomy & Physiology. In the summer after 11th grade, they can begin Nursing clinicals or earn an Emergency Medical Responder credential, and seniors participate in a Nursing pre-apprenticeship with Ochsner. Students who complete this pathway can directly enter the workforce via Ochsner's state Registered Nursing apprenticeship and are well on the way to a Registered Nursing degree.

These are just two examples of how, given the national shortage in healthcare workers that is projected to widen over the next decade, states and communities are developing comprehensive Nursing pathways that enable students to explore health careers early, complete pre-Nursing courses and gain clinical experience while in high school, and earn a range of healthcare credentials that enable them to work in middle-skilled entry-level jobs while completing studies toward Associate or higher degrees.

RECOMMENDATION 1

## Make sure the endpoint is a healthcare credential of value.

Successful pathway maps guide students and families toward certificates and degrees aligned with high-wage careers. In comparison to Cybersecurity and Mechatronics, Nursing pathways tend to map course sequences further toward a Bachelor's degree, reflecting the importance many health employers place on a four-year degree for Registered Nurses. Most Nursing pathway maps we examined also include other healthcare industry certifications along the way. Some, like H-TECH, enable students to earn short-term certificates in middle-skill occupations such as Phlebotomist or Pharmacy Technician. Pathways that build in such certifications expose students to a range of healthcare jobs and provide them with the opportunity to work in the sector while continuing their studies toward Nursing.

More commonly, pathways allow students to earn a Certified Nurse Aide (CNA) certification, which can be valuable for building high schoolers' confidence and identity in healthcare and enabling them to get hired into entry-level jobs as a stepping stone to further advancement. However, the CNA alone typically does not lead to a family-sustaining wage, with the national median pay for Nursing Assistants in 2023 at $38,130. Nursing and pre-Nursing pathways should not treat the CNA as an endpoint but be clear on how it leads to further advancement, and consider building regional wage information into pathway maps. Communities should consider ways to track the long-term outcomes of pathway graduates, with particular attention to wages and degree attainment beyond the CNA and other entry-level credentials.

RECOMMENDATION **2**

## Build on the work of others who have mapped Nursing course sequences.

While the local context of college requirements and employer needs must be considered, we observed broad uniformity among Nursing course sequences across different states and communities. Nearly every Nursing pathway begins with an introductory course called Fundamentals (or Principles) of Health Science, followed by Medical Terminology, Anatomy and Physiology, and Microbiology. Some pathway maps are explicit about prerequisites to those courses, such as General Psychology, Biology, Chemistry, or college placement, while others are less clear about how and where prerequisite coursework is built into the pathway.

Career-connected learning experiences are frequently required within Nursing pathways, though they typically come at the end of the pathway due to age requirements for working in healthcare. These experiences include clinicals, internships, and simulation labs, allowing students to apply theoretical knowledge in practical healthcare settings, build social capital with professionals in the field, and complete clinical experiences required for certification and licensure.

### QUESTIONS TO CONSIDER

- Do local healthcare employers tend to hire registered nurses with an Associate degree in Nursing, or is a Bachelor of Science (BS) strongly valued?
- What short-term credentials can students earn through the pathway? What wages do workers in these occupations make? Who supports pathway completers to continue their education past entry-level credentials so they don't get "stuck" in low-wage jobs?
- How will healthcare employers partner on providing career-connected learning, and at what point(s) in the sequence?
- What are the requirements and restrictions for credentialing and working in these occupations (age, justice system involvement, or otherwise)? How might barriers to equity be mitigated?

# CYBERSECURITY

Denver Public Schools and the Community College of Denver have mapped out how a student could earn an Associate of Applied Science (AAS) in Cybersecurity by high school graduation—as well as options to earn 15 and 30 credits toward the degree—through a combination of Advanced Placement, dual enrollment, and career/technical courses. Beginning in 9th grade, students use elective blocks to take Computer User Support and Networking courses. Students who complete the 30-credit option can earn a Certificate of Graphic Design from Community College of Denver.

Wayne-Finger Lakes Pathways in Technology Early College High (P-TECH) School in upstate New York has mapped a six-year pathway to a AAS in Cybersecurity that integrates courses at Finger Lakes Community College starting in 9th grade. Ninth-graders start with Computing Science Portal and Core Excel and move on to Computer Imaging and Intro to Programming and Computing I in 10th grade. Students in the 13th and 14th grades continue to get support from a P-TECH liaison on career readiness, a Computer Science internship for college credit, job seeking, and transfer to a four-year program if desired.

Pathways to Cybersecurity occupations are responding to the ballooning need across industries to keep computers, networks, and information secure. Many of the pathway maps for Cybersecurity emphasize the large number of unfilled jobs, minimal unemployment rate, and high entry-level wages of Cybersecurity professionals. What's more, a number of the maps and materials appeal to students' motivations for protecting society from cybercriminals. Northeast Early College High School in Austin asks students "Do you have Facebook? What about Snapchat?" Georgia's pathway map frames cyber threats as ranging from "inconvenient to life-threatening." And Basha High School's CyBEARsecurity Academy in the Phoenix area exhorts students to "stop the bad guys" in a pathway recruitment video. Framing Cybersecurity as a helping profession could help to increase diversity and equity within this pathway and to expand the pool of students entering this growing field.

RECOMMENDATION 1

## Consider the applicability of Cybersecurity courses and credentials in the broader Information Technology (IT) context.

Nearly all the maps we examined led to an Associate in Applied Science in Cybersecurity and include Cybersecurity-specific courses, often as a first or early course in the technical course sequence. Notably, we did not see many Cybersecurity pathways begin with Intro to Computer Science and other common foundational courses required for a BS in Computer Science or Computer Engineering. Communities designing Cybersecurity pathways should consider which courses in the AAS degree transfer to a BS, the extent to which the AAS is in demand and leads to high-wage jobs with local employers, and what balance they wish to strike between designing for the knowledge and skills employers seek in Cybersecurity and ensuring broader applicability within IT.

RECOMMENDATION
**2**

## Build in periodic cycles to ensure that the Cybersecurity pathway continues to align with current industry needs.

The Cybersecurity field is evolving rapidly, with a growing shift from security compliance to risk management and vulnerability management, as well as an increase in the use of machine learning and artificial intelligence to identify and respond to threats. Given this, pathways should develop a sustainable cycle for ensuring that pathway coursework, outcomes, and credentials continue to align with the needs and expectations of local employers. These may include major IT companies as well as a range of other sector employers in the regional economy with Cybersecurity needs. For instance, Northeast Early College High School in Austin partners with Dell both to inform the content of the pathways and provide students with mentoring, workplace learning and internships. Other communities might consider an advisory board of several employer types or other forum that enables their Cybersecurity programming to be nimble. In particular, communities should pay attention to changing expectations and requirements for what types of degrees and credentials employers look for when hiring into specific Cybersecurity positions, and their perceptions of Bachelor's degrees, Associate of Applied Science degrees from local colleges, and industry certifications.

### QUESTIONS TO CONSIDER

- How will employers continue to engage to inform pathway stakeholders about changing needs, trends, and requirements in Cybersecurity?
- If the pathway leads to an Associate's in Applied Science, to what extent does that AAS stack to a Bachelor's degree? What opportunities are there to prioritize courses in the pathway that meet both AAS and BS requirements?
- What industry credentials do regional employers value, and how might that differ based on employer type (e.g. major technology company vs. non-tech employer)? How important is credentialing vs. demonstration of skills when assessing entry-level employees?
- Given the rapid growth and employment needs in Cybersecurity, what type of messaging or ambassadorship could the pathway use to increase recruitment and diversity?

# MECHATRONICS

Oakland High School in Tennessee lets students earn a full Associate's of Applied Science degree in Mechatronics from Motlow State Community College by high school graduation. The Mechatronics pathway coursework begins in 9th grade, with students completing a competitive application to enter the Motlow State AAS program as juniors. In the 9th grade intro course in the sequence, called Engineering Design, "students learn 3D CAD (Computer Aided Design), including additive manufacturing and assembly using Solidworks along with having the opportunity to earn their CSWA (Certified Solidworks Associate certification)."

At College of Lake County's (CLC) Mechatronics Career Pathway in Illinois, high school students start with Mechanical Systems I, which covers "basic safety protocol, the role of mechanical components in complex mechatronic systems, the flow of energy in a mechatronic system, calculation of force, accelerations, speed, torque, etc. and basic maintenance and systems-level troubleshooting." The pathway leads to a 30-credit certificate which stacks to an Associate of Applied Science Degree in Mechatronics at CLC as well as Siemens Level I and II certifications.

Georgia's program of study guide encourages ninth-graders to take Introduction to Mechatronics, where they "investigate the principles governing electricity as well as how to analyze circuits and the principles of pneumatic systems." After completing two other career/technical courses in the Mechatronics sequence, students take an End of Pathway Assessment to earn a Mechatronics Level 1 industry credential from NOCTI and/or pursue further Mechatronics studies through the state's technical college system. After graduating from high school, students may choose to pursue a Mechatronics Technician Certificate, Industrial Systems Technology Diploma or Industrial Systems Technology Degree through the state's technical college system, or a Bachelor of Science at the University System of Georgia.

These examples illustrate the variance among pathways in Mechatronics, a branch of engineering that encompasses mechanics, electronics, computing, and robotics and prepares students for a range of occupations in Advanced Manufacturing and beyond. As an interdisciplinary field, students take fundamental courses in engineering design, electronics, mechanical systems, DC circuits, robotics, and more. While certain content and competencies recur, both the nomenclature and sequencing of Mechatronics pathway course maps vary significantly by community. Unlike Nursing and Cybersecurity, Mechatronics pathway maps almost always include an explanatory overview of the pathway and Mechatronics career options, as well as detailed individual course descriptions—reflecting both the complexity of the Mechatronics field and student, family, and educators' relative lack of familiarity with it.

RECOMMENDATION 1

## Understand the context of the region's manufacturing employers.

Partnering with employers and aligning pathway outcomes to employment needs is critical in any industry area. But given the breadth and variability in Mechatronics, the context of the local manufacturing sector is particularly critical in informing the coursework, competencies, and certifications embedded in a pathway map. And given the growing shortage and urgency in some communities to hire technicians with this integrated set of skills, manufacturing employers are increasingly willing to come to the table with a more active role in shaping and providing education for their pipeline of future employees.

For example, the Mechatronics Technology Pathway at Tri-County Technical College in South Carolina was created with employer input and designed to prepare students for employment "primarily in advanced manufacturing, including aerospace, automotive, medical, and plastics." iMEC 2.0, a Mechatronics distance learning model that serves rural high students in Minnesota and Nebraska, engages businesses from both states representing energy, biofuels, food processing, and manufacturing.

RECOMMENDATION 2

## Communicate explicitly about what students learn in Mechatronics, and what careers they might enter.

To make access equitable, families need help understanding Mechatronics and Advanced Manufacturing in plain language, as well as how it differs from what past generations experienced in a manufacturing career path. Communities designing Mechatronics pathways should provide overall context about Mechatronics as well as course descriptions that make this technical field more transparent. Many of the course maps we studied came with accompanying collateral entitled "What is Mechatronics?" or videos that break down the field.

### QUESTIONS TO CONSIDER

- Which specific high-wage, high-growth occupations are local manufacturing employers hiring for? What competencies do those workers need?
- What postsecondary degrees, certificates, and programs do those employers most value? Are industry certifications or local colleges' Mechatronics certificates more highly recognized? What educational and work-based learning experiences have their successful employees followed?
- To what extent are local families, students, and high schools familiar with Mechatronics? What type of print, video, and digital media are needed to broaden awareness and understanding? What types of perceptions about manufacturing do they hold, and are there any myths that should be dispelled?

# CONCLUSION

## Considerations for Developing High-Quality Education-to-Career Pathways

Our document review, coupled with our experience partnering with regions on pathway design, surfaced the following considerations for partners co-creating local programs of study:

1. **Start with industry demand:** Leverage data to gain insight into the needs of the regional labor market, validate that data with local employers, and set a bar for robust or above average demand to justify pathway development and investment. Ensure that pathways are aligned with current and future trends in industry needs, tailored to each community's context.
2. **Prioritize cross-sector collaboration:** Engage higher education, employers, and K-12 in designing and updating pathway curriculum to maintain relevance and applicability, and in facilitating early college courses and career-connected learning.
3. **Give students enough momentum to a degree:** Pathway maps should include sufficient numbers of academic and technical courses that meaningfully propel students toward degree completion. At a minimum, they should include four college courses of at least 12 credit hours—and should include options for students who are able to proceed further in their postsecondary journey to a semester or more.
4. **Ensure college credits are transferable:** Align with statewide transfer systems when possible, and establish articulation agreements with additional colleges and universities to ensure that credits earned in high school or other programs are transferable and count towards postsecondary degrees or certifications. Prioritize making courses that are already transferable more accessible. Alongside transferable college credit, provide opportunities for students to earn industry credentials, and validate with employers that these credentials have value in the regional economy.
5. **Center accessibility and equity:** In designing pathways, center the needs and experiences of low-income students, underrepresented students, and students from rural communities. These students need local institutions to seek innovative solutions to recruitment, access, and equity that go beyond just providing information.
6. **Incorporate career-connecting learning:** Integrate career learning aligned to course curriculum to promote career awareness, exploration, preparation, and training. Opportunities like job shadows, client projects, employer challenges, student enterprises, internships, and apprenticeships provide students with practical experiences, skill development, and social capital.
7. **Provide the advising and navigation to enable seamless transitions:** Build cross-sector systems of advising that help students explore their identity and options, build belonging within their program of study, and understandhow high school, college, and employment connect.
8. **Establish clear measures of success that inform pathway improvement:** Develop measurable, short- and longer-term targets for student participation and equity in early college course completion, work-based learning, credential attainment, and employment, and use the data to identify areas for pathways to evolve.


### ACKNOWLEDGMENTS

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# APPENDIX

The following visuals provide three examples of how communities illustrate student progress through an education-to-career pathway.

## Illinois District 214 Nursing Pathway

Health Science

### Nursing

214 HIGH SCHOOL DISTRICT

| | 9 | 10 | 11 | 12 |
|---|---|---|---|---|
| **Nursing** | Introduction to Healthcare Field 1 (WHS, EGHS, JHHS)<br>Exercise Physiology (PHS, BGHS, RMHS) | Introduction to Healthcare Field 2/ Medical Terminology<br>Human Physiology/ Medical Terminology (BGHS) | College Nursing Assistant Training (DC)<br>College Human Anatomy and Physiology (DC)<br>Honors Physics (BGHS, EGHS, RMHS, WHS) | Middle College Health Careers (application required)<br>D214 Youth Apprenticeship: Nursing |

**High School District 214 Graduation Requirements**

| | | |
|---|---|---|
| English | English \| English \| English \| English<br>Course Descriptions Section - Page 235 | 4.0 credit units |
| Mathematics | Mathematics \| Mathematics \| Mathematics \| Mathematics (Recommended)<br>Including one unit of Algebra I and one unit of Geometry.<br>Course Descriptions Section - Page 263 | 3.0 credit units |
| Social Science | Social Science \| Social Science \| Social Science (Recommended)<br>Must include one year of U.S. History or combination of U.S. History and American Government and one semester civics.<br>Course Descriptions Section - Page 281 | 2.0 credit units |
| Science | Science \| Science \| Science (Recommended)<br>Course Descriptions Section - Page 273 | 2.0 credit units |
| Career & Technical Education | Career and Technical Education<br>Course Descriptions Section - Page 295 | 1.0 credit unit |
| Fine Arts | Fine Arts<br>Course Descriptions Section - Page 251 | 0.5 credit unit |
| Consumer Education | Consumer Education<br>Students meet the consumer education graduation requirement by passing one of the following courses or combination of courses: Personal Finance (06210) - Page 300, Economics (07830) - Page 285, AP Economics (07930) - Page 283, Consumer Education (59940) - Page 331. | 0.25 credit unit |
| Physical Education | Physical Education \| Health \| Physical Education \| Physical Education<br>A minimum of 3-5 days of daily physical education is a required course for all students in each of four years of high school. The State also requires that students during high school take a minimum of 18 weeks (one semester) of health education.*<br>Course Descriptions Section - Page 323<br>Refer to page 343 in Academic Policies and Procedures section regarding substitutions for physical education. | ✱ |

### Post Secondary

**Career Related Electives**
- AP Psychology
- College Health Occupations Career Observation (DC)
- College Introduction to Health Careers
- Experiential Medical Physiology and Biochemistry
- Human Physiology

**Career Related Activities for the Health Science pathway**
- Athletics
- Debate Team
- District Career Days
- District Career Nights
- District Career Treks
- Health Career Clubs
- Student Athletic Trainers

**Four-Year University Admission Requirements**
- English (4 years)
- Mathematics (4 years)
- Social Science (3-4 years)
- Science (2-3 years)
- World Language (2-3 years)
- Fine Arts (1-2 years)

See your counselor regarding admission requirements for highly selective institutions.

*Honors, Advance Placement and Dual Credit courses are offered throughout the curriculum. Please consult with your high school counselor for the latest information regarding course offerings, scheduling and registration for all career pathways and courses.*

**This represents the number of units of credit required at full implementation for the graduating class of 2012 and beyond (12 units, assuming a unit is equivalent to a year-long course). Additionally, physical education, while not a state graduation requirement is a required course for all students a minimum of 3-5 days a week in each of four years of high school (See ILCS 110,5/27-6 and 23 Ill.Adm. Code Section 1.425).*

**Medical Academy and Middle College**

District 214 gives students interested in health science careers early opportunities for success through two Health Science Pathway programs.

Through Medical Academy, seniors can observe professionals at local hospitals, participate in work-based learning experiences and explore topics such as anatomy, physiology and organic chemistry to prepare for careers in health science.

The D214 Middle College at Harper Health Professions Program is designed for students who plan to complete a healthcare program at Harper College following high school graduation. Through Middle College, seniors take dual credit health science and general education courses on the Harper College campus full-time. The program is designed for students working to earn associate degrees in areas such as nursing, dental hygiene and surgical technology or for certificates in medical assisting, EKG technician, medical coding and more.

Students can earn up to 30 college credit hours during their senior year, whether they are interested in preparing for an associate degree program or pursuing an industry certificate.

# St. Johns County School District (FL)

**Career Cluster:** Information Technology (STEM)

**Career Cluster Pathway:** Applied Cybersecurity

**CTE Program: Secondary:** Academy of Emerging Technology - Cybersecurity (9001300)
**Creekside High School, St. Johns County School District**
**Postsecondary: St. Johns River State College: St. Augustine:** Computer Network Engineering Technology (AS) (1511100111); Internet Services Technology (AS) (1511080102) Network Security (CCC) (0511100118); Information Technology Support Specialist (CCC) 0511010311

**Industry Certification: Secondary:** Information Technology Specialist (ITS) – Python (CERTI012), Information Technology Specialist (ITS) – Network Security (CERTI006), Information Technology Specialist (ITS – Networking (CERTI007), CompTIA IT Fundamentals+ (COMP018), CompTIA Security + (COMPT008), **Postsecondary: St. Johns River State College:** CompTIA A+ (COMPT001), CompTIA Network + (COMPT006), CompTIA Security + (COMPT008)

CREEKSIDE HIGH SCHOOL Academy of Emerging Technology

| | | 16 CORE CURRICULUM CREDITS | | | | | 8 ADDITIONAL CREDITS | |
|---|---|---|---|---|---|---|---|---|
| | | **ENGLISH** 4 credits | **MATH** 4 credits | **SCIENCE** 3 credits, 2 with lab | **SOCIAL STUDIES** 3 credits | **OTHER REQUIRED COURSES** **FINE ARTS** (1 credit) **PHYSICAL EDUCATION** (1 credit) | **CAREER AND TECHNICAL EDUCATION COURSES** | **RECOMMENDED ELECTIVES** (ALIGNED WITH COMMUNITY COLLEGE & STATE UNIVERSITY SYSTEM PROGRAMS) |
| **HIGH SCHOOL** | | • Students are encouraged to use mycareershines.org to explore careers and postsecondary options.<br>• Students are also encouraged to participate in dual enrollment courses which may be used to satisfy high school graduation or Bright Futures Gold Seal Vocational Scholars course requirements.<br>• One course within the 24 credit program must be an online course. Cumulative GPA of 2.0 on a 4.0 scale for 24 credit program | | | | | | |
| | **9th** | English 1 (H) | Algebra 1 or Geometry (H) | Physical Science/Biology Honors | World Geography/AP Human Geography | HOPE – Health Opportunities through Physical Education | Foundations of Programming 9007210 | Elective or Foreign Language |
| | **10th** | English 2 (H) | Geometry (H) or Algebra 2 (H) | Biology/Chemistry (H) | World History (H/ AP) | Fine or Practical Arts | Computer and Network Security Fundamentals 9001320 | Elective or Foreign Language |
| | **11th** | English 3 (H, DE, AP) | Algebra 2 or Pre-Calculus (H) | Chemistry (H) or Physics (H) | US History (AP) | Elective | Cybersecurity Essentials 9001330 | AP Computer Science Principles 0200335 or Elective or Foreign Language |
| | **12th** | English 4 (H, DE, AP) | Math for College Readiness or AP/ DE Mathematics | AP/ DE Course Offerings | Economics/ US Government (H/AP/DE) | Elective | Operational Cybersecurity 9001340 | AP Computer Science Principles 0200335 or Elective or Foreign Language |

| **POSTSECONDARY** | **TECHNICAL CENTER PROGRAM(S)** | **COMMUNITY COLLEGE PROGRAM(S)** | **UNIVERSITY PROGRAM(S)** |
|---|---|---|---|
| | **Based on the Career Cluster of interest and identified career and technical education program, the following postsecondary options are available.** | | |
| | St. Johns River State College, St. Augustine: Information Technology Support Specialist - CCC, Network Security – CCC | St. Johns River State College: St. Augustine: Computer Engineering Technology – A.S., Internet Services Technology – A.S. | • St. Johns River State College, St. Augustine: Organization Management – Computer Operation Systems - B.S.<br>• University of N. Florida, Jacksonville: Computer Networking – B.S.<br>• University of W. Florida, Pensacola: Cybersecurity, IIT Networking – B.S.<br>• University of MD, Adelphi, MD: Cybersecurity and Homeland Security - B.S.<br>• Embry Riddle Aeronautical University: Cybersecurity - Engineering, Cybersecurity Management and Policy - M.S.<br>• University of S. Florida: Cybersecurity - M.S. |

| **CAREER** | Sample Career Specialties | | |
|---|---|---|---|
| | Network Administrator, Cybersecurity Technician, Network Infrastructure Technician **Computer Network Support Specialist** | Network Administrator, Cybersecurity Technician, **Computer Network Support Specialist** | Network Security Analyst, Computer & Information Systems Manager, **Computer Network Architect,** Network/Cybersecurity Administrator, Computer Systems Engineer, **Computer Network Support Specialist, Computer and Information Systems Manager** |

| **CREDIT** | **Articulation and CTE Dual Enrollment Opportunities** | |
|---|---|---|
| | Secondary to Technical Center(PSAV) | Secondary to College Credit Certificate or Degree | PSAV/PSV to AAS or AS/BS/BAS |
| | NA | CompTIA A+ = CET 1178 and CET 2179, 6 hours in Computer Engineering Technology; Network + = CNT 2500, 3 hours in Computer Engineering Technology | NA |

**Career and Technical Student Association**

Future Business Leaders of America (FBLA), CyberPatriots

**Internship/Work Experience Recommendations**

Career Academy students may apply for summer internships after their junior year.

**Program of Study Graduation Requirements:** http://www.fldoe.org/academics/graduation-requirements

## Tri County Technical College (SC)