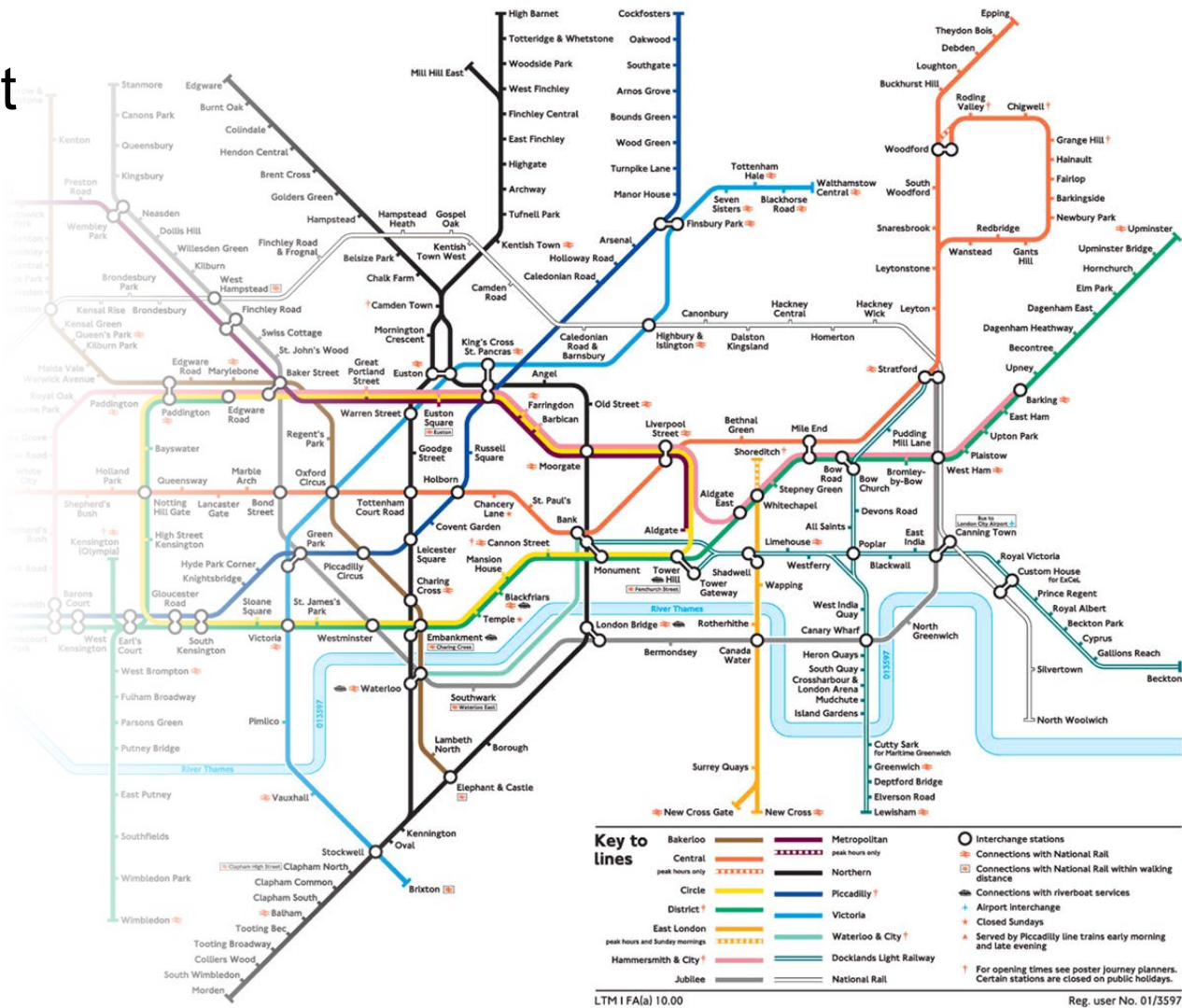


# Pathway as 'Transit Map'—Defining 'Station Stops'

In the context of Credential Engine:

- Pathway is a...
  - Resource composed of a structured set of components defining points along a route to fulfillment of a goal or objective.
- *Components* are defined points which describe an objective and its completion requirements:
  - Competencies
  - Assessments
  - Credentials
  - Work experience
  - Jobs
  - Pathways
  - And more

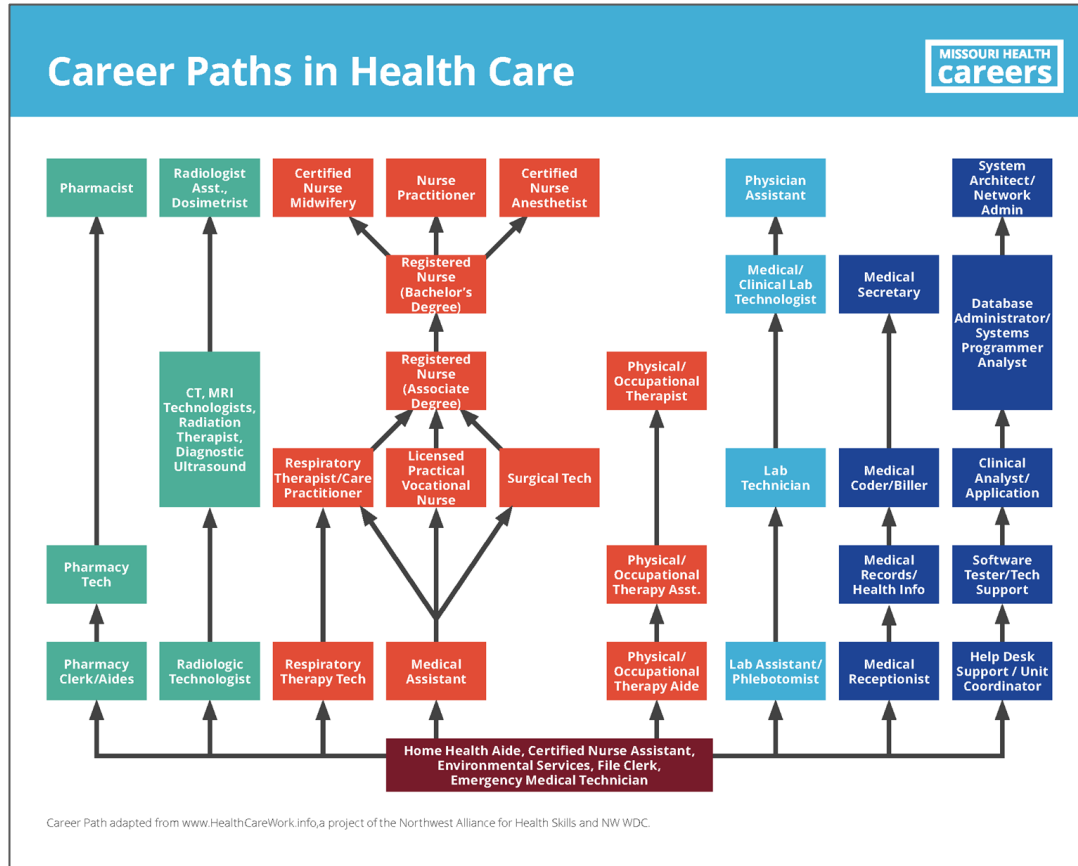


# Use Cases

- Students and workers search for career pathways
- Find credentials, learning opportunities, assessments that meet a career goal
- Optimize an individual's career and education pathway for:
  - lowest costs, short-term costs, or total costs
  - time commitments, intensive, full time, part time, weekend
  - most transfer value for earned credentials and learning from experiences
  - future portability via connections and stacking with other credentials

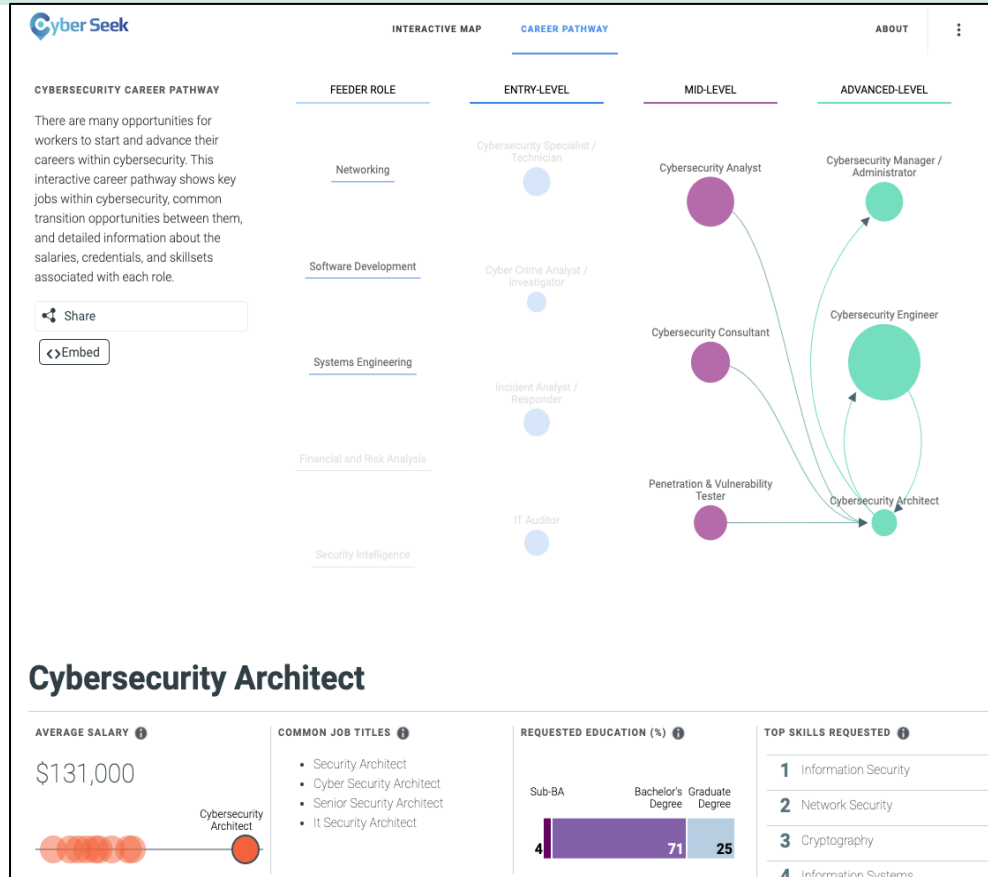
# Example: Missouri Career Paths in Health Care

<https://missourihealthcareers.com/resources/career-paths-in-health-care/>



# Example: Cyberseek Career Pathway Cybersecurity

<https://www.cyberseek.org/pathway.html>



# Example: SUNY Empire State College PLA Guide

<https://www.esc.edu/degree-planning-academic-review/prior-learning-assessment/>

1 Stop MyESC Alumni & Supporters Faculty & Staff 1-800-GO-TO-ESC Apply Search

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COVID-19 Response

▼ Degree Planning and Academic Review
Degree Program • Student Degree Planning Guide • Current ESC Professional Learning Evaluations


## Professional Licenses and Certificates

License or Certificate Evaluated	Credit Awarded
American Design Drafting Association (ADDA) Mechanical Certified Drafter	6
American Heart Association: Advanced Cardiovascular Life Support (ACLS) Certification	2
American Heart Association: Pediatric Advanced Life Support (PALS) Certification	2
American Nurses Credentialing Center	4
Certified Director of School Facilities	17
Certified Prevention Specialist Certification	10
CASAC: Credentialed Alcoholism and Substance Abuse Counselor Certification	16 or 32
CASAC-T: Credentialed Alcoholism and Substance Abuse Counselor Trainee Certification (training start date after 9/1/13)	16
Emergency Medical Technician (EMT/AEMT) Certification	up to 40
FINRA Series 7 Examination/General Securities License	6
International Society of Automation: Certified Automation Professional (CAP) Certification	6
International Society of Automation: Certified Control Systems Technician (CCST) Level I Certification	3
International Society of Automation: Certified Control Systems Technician (CCST) Level II Certification	4
International Society of Automation: Certified Control Systems Technician (CCST) Level III Certification	4

2 SUNY EMPIRE STATE COLLEGE • INDIVIDUALIZED PRIOR LEARNING ASSESSMENT						
STEPS IN THE INDIVIDUALIZED PRIOR LEARNING PROCESS						
Steps in the iPLA Process	You	Your Mentor	Center Office of Academic Review (COAR)	The Evaluator	The Faculty Committee	Office of Collegewide Academic Review (OCAR)
<b>Step 1</b> Identify your college-level knowledge ↓	<ul style="list-style-type: none"> <li>Work with your mentor</li> <li>Examine your experiences and identify how your knowledge fits best into your degree plan</li> </ul>	<ul style="list-style-type: none"> <li>Helps you identify your college-level knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Provides free workshops on iPLA</li> </ul>			
<b>Step 2</b> Describe and document your learning ↓	<ul style="list-style-type: none"> <li>Prepare your learning description with supporting documentation</li> <li>Propose a title, the number of possible credits and credits designations (e.g., liberal arts and sciences, general education, level)</li> </ul>	<ul style="list-style-type: none"> <li>Reviews your iPLA request and gives feedback, as needed</li> </ul>				
<b>Step 3</b> Submit your prior learning request ↓	<ul style="list-style-type: none"> <li>Log onto PLA Planner through MyESC/Academics/Your Degree Plan or <a href="http://www.esc.edu/PLA">www.esc.edu/PLA</a></li> <li>Set up your request (learning description, supporting materials, credit information and link to degree plan)</li> <li>Submit your request to your mentor for approval</li> </ul>	<ul style="list-style-type: none"> <li>Reviews your request and, if ready, submits to COAR</li> </ul>	<ul style="list-style-type: none"> <li>Provides assistance, as needed</li> <li>Reviews your iPLA request and provides feedback, as needed</li> </ul>			
<b>Step 4</b> Request is reviewed and assigned to an evaluator ↓			<ul style="list-style-type: none"> <li>Reviews your request and, if ready, assigns a qualified evaluator</li> </ul>			
<b>Step 5</b> A qualified evaluator assesses your college-level learning ↓	<ul style="list-style-type: none"> <li>Contact the evaluator to set up your interview</li> <li>You are interviewed by the evaluator</li> </ul>			<ul style="list-style-type: none"> <li>Reviews your request and checks your degree plan for redundancy</li> <li>Interviews you regarding your learning</li> </ul>		
<b>Step 6</b> The evaluator writes and submits a credit recommendation report ↓				<ul style="list-style-type: none"> <li>Requests additional information or documentation, as needed</li> <li>The evaluator writes and submits a credit recommendation report</li> </ul>		
<b>Step 7</b> The college reviews and approves the evaluator's credit recommendation			<ul style="list-style-type: none"> <li>COAR reviews and includes the evaluator's recommendation report in your degree plan</li> </ul>		<ul style="list-style-type: none"> <li>Reviews and approves the credit recommendation, as part of your degree plan review</li> </ul>	<ul style="list-style-type: none"> <li>Approves the PLA credits as part of the final review (concurrency) of your degree plan and officially posts your PLA credits in your student record</li> </ul>

# Example: University of Minnesota AP Score Awards

<https://admissions.tc.umn.edu/academics/ap.html>

 UNIVERSITY OF MINNESOTA Driven to Discover			
+ Menu			
Area/Test	Score	Award <sup>2</sup>	Liberal Education Award <sup>2</sup>
Art History	3.4.5	4 credits in Art History 1001 (Introduction to the History of Art)	Arts/Humanities core requirement. Global Perspectives theme
Biology	3.4.5	4 credits in Biology 1009 (General Biology)	Biological Science/Lab requirement
Calculus AB	3.4.5	4 credits in Math 1271 (Calculus I)	Mathematical Thinking core requirement
Calculus BC	1.2 and AB subscore of 3.4.5	4 Credits in Math 1271	Mathematical Thinking core requirement
	3	4 credits in Math 1271	Mathematical Thinking core requirement
	4.5	8 credits in Math 1271, 1272 (Calculus I-II)	Mathematical Thinking core requirement
Chemistry	3	4 credits in Chemistry 1061, 1065 (Chemical Principles I with Lab)	Physical Science/Lab requirement; Does NOT fulfill Environment theme
	4.5	8 credits in Chemistry 1061, 1062, 1065, 1066 (Chemical Principles I and II with Lab)	
Chinese Language and Culture		No credit granted	
Computer Science A	3.4.5	4 credits in Computer Science 1103	
Computer Science Principles	3.4.5	4 credits in Computer Science 1001	Mathematical Thinking core requirement and Technology and Society theme
Economics-Micro	4.5	4 credits in Econ 1101 (Principles of Microeconomics)	Social Science core requirement; Does NOT fulfill Global Perspectives theme

# Example: KBOR Military Service Transfer Value

[https://military.kansasregents.org/MAP/course\\_info/001902/25](https://military.kansasregents.org/MAP/course_info/001902/25)



[KansasRegents.org](#) ▶ [Military Portal Search](#) ▶ [Course](#)



**Army MOS 11B:**

Infantryman

**Service Level:**


10 ▼

COURSE ID	COURSE TITLE	HOURS
HPR6325	LIFETIME FITNESS	1
HPR6330	PHYSICAL CONDITIONING I	1
CAP1516	COMPUTER APPLICATIONS	3
ALH5211	BASIC FIRST AID	1
INR3735	INDUSTRIAL TECHNICAL WRITING	3
BUS1640	BUSINESS COMMUNICATIONS	3
COM2725	INTERPERSONAL COMMUNICATION	3
BUS1311	INTRODUCTION TO BUSINESS	3
MAXIMUM HOURS FOR LEVEL OR RANK		18

[Github Example JSON-LD](#)

# Example: Indiana Core Transfer Library

<https://transferin.net/transfer-resources/transfer-databases/core-transfer-library/>



## Core Transfer Library

**Institution:**  **CTL Name:**

*Tip: You can make multiple selections in the dropdown menus.*

**Search:**  **Show** 25  **entries**

Institution	CTL Name	Course Title	Course Number	Credits	Notes
Ancilla College	American History 1	US History to 1877	HIST 144	3	
Anderson University	American History 1	American Civilization 1, Colonial to 1865	HIST 2110	3	
Ball State University	American History 1	American History, 1492-1876	HIST 201	3	
Indiana State University	American History 1	The United States to 1877	HIST 201	3	
Indiana University Bloomington	American History 1	American History I	HIST-H 105	3	
Indiana University East	American History 1	American History I	HIST-H105	3	
Indiana University Kokomo	American History 1	American History I	HIST-H 105	3	
Indiana University Northwest	American History 1	American History I	HIST-H 105	3	



# Example: WICHE Interstate Passport

[http://interstatepassport.wiche.edu/documents/IP\\_Overview.pdf](http://interstatepassport.wiche.edu/documents/IP_Overview.pdf)



## INTERSTATE PASSPORT OVERVIEW

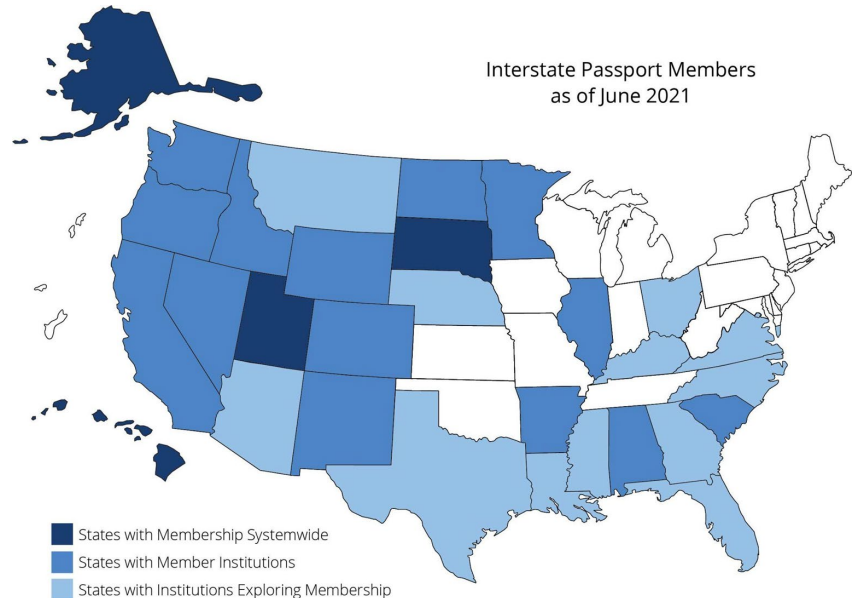
### WHAT

Based at the Western Interstate Commission for Higher Education (WICHE), Interstate Passport® is a national program facilitating block transfer of completed lower-division general education based on student learning outcomes, rather than on specific courses and credits. Students who transfer with a Passport to another member institution are recognized as having completed all lower-division general education requirements prior to transfer, regardless of course titles and credits.

Interstate Passport builds on the learning outcomes work of individual campuses and their related general education reforms. It is also consistent with and integrates well with campus-guided pathways work.


### HOW

An institution determines if its own learning outcomes for lower-division general education are congruent with and cover the same range of learning as the [63 Passport Learning Outcomes \(PLOs\)](#) included in the nine knowledge and skill areas. The institution identifies the courses and lists of choices (Block) by which students can achieve the PLOs, awards a Passport to students who earn it, and reports the awards to the National Student Clearinghouse (NSC). Participating institutions also report academic progress data on transfer students to NSC, which sorts the data and sends reports about their former students to each sending institutions for use in continuous improvement efforts.



# Example: ACE Course Credit Transfer Recommendation

<https://www.acenet.edu/National-Guide/Pages/Course.aspx?org=SOPHIA+Learning%2c+LLC&cid=6bb6586f-94c4-ea11-a812-000d3a378a3a>



## Principles of Finance

Course Summary | Credit Recommendation & Competencies | Description | Instruction & Assessment

ACE National Guide » Principles of Finance

### PRINCIPLES OF FINANCE

#### Course Summary

**Credit Type:** Course  
**ACE Course Number:** SOPH-0033  
**Organization Course Number:** FIN1001  
**Number:**  
**Organization:** SOPHIA Learning, LLC  
**Location:** Online  
**Length:** This is a self-paced course. Students have 60 days with 30 days extension (if needed) to complete  
**Dates Offered:** 6/1/2020 - 5/30/2023

#### Credit Recommendation & Competencies

Level	Credits (SH)	Subject
Lower-Division Baccalaureate	3	principles of finance

#### Description

**Learning Outcomes:**

- describe the operating environment of the firm, the role of financial institutions, and the structure of the capital markets and explain their impact on the financial

[VIEW ALL COURSES >](#)

**Other offerings from SOPHIA Learning, LLC**

- Accounting (SOPH-0010)
- Ancient Greek Philosophers (SOPH-0027)
- Applied Introductory Math (SOPH-0045)
- Approaches to Studying Religions (SOPH-0008)
- Art History I (SOPH-0006)
- Art History II (SOPH-0029)
- Business Law (SOPH-0032)
- College Algebra (SOPH-0001)
- College Readiness (SOPH-0031)
- Communication at Work (SOPH-0034)

- explain the time value of money and calculate future value and present value for single and multiple cash flows
- describe the characteristics of capital market instruments including stocks, bonds, and money market instruments
- explain the capital budgeting process and the basic elements of working capital management
- describe the sources of long-term capital and its importance to sustaining operations

**General Course Topics:**

- Goals and organizations of financial management
- Statements, taxes, and cash flow
- Analyzing financial statements
- Forecasting financial statements
- Time value of cash flows
- Bond valuation
- Stock valuation
- Risk and return
- Market efficiency and returns
- Cost of capital
- Capital structure
- The role of risk in capital budgeting
- Obtaining capital
- Working capital management
- Dividends and dividend policy

[Github Example JSON-LD](#)

### Instruction & Assessment

**Instructional Strategies:**

- Audio Visual Materials
- Computer Based Training
- Practical Exercises
- Case Studies
- Lectures

**Methods of Assessment:**

- Examinations
- Quizzes

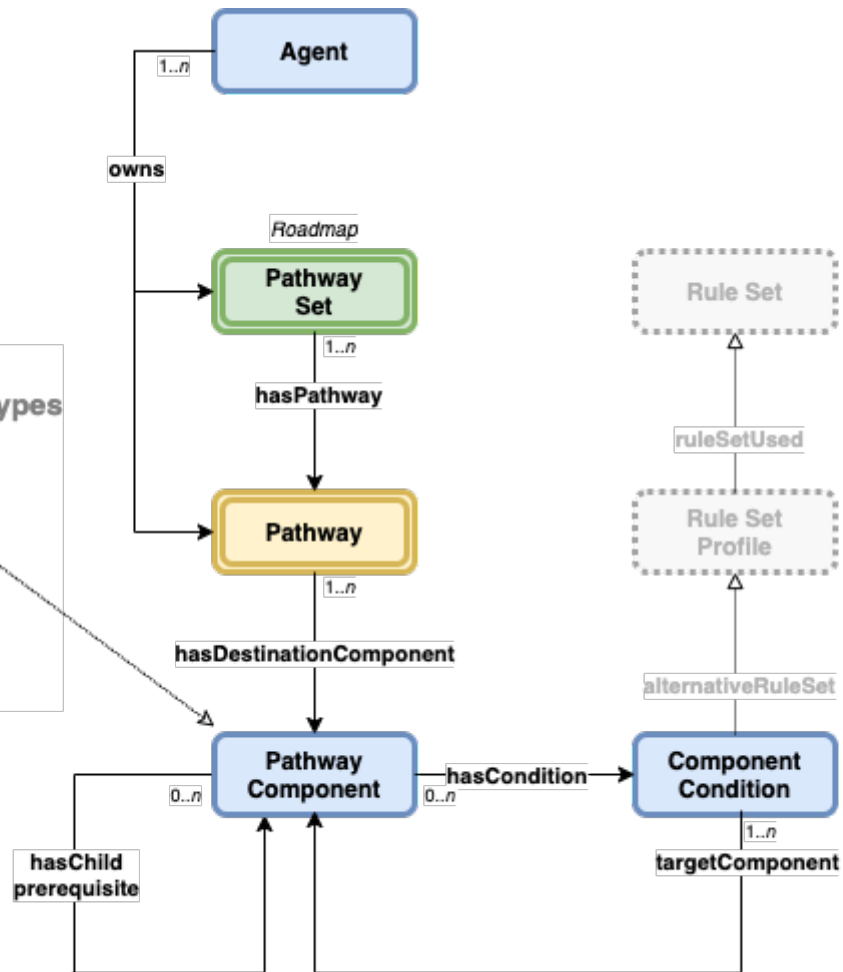
**Minimum Passing Score:**

70%

# Pathway Domain Model

## Component Types

Assessment  
Basic  
Cocurricular  
Competency  
Course  
Credential  
Extracurricular  
Job  
Work Experience



## Future Rule Set Types

Rule Sets that machine identify the rules or methods by which one or more PathwayComponent instances satisfy the requirements of a ComponentCondition.

# MCTA Pathway Opportunities

- Build on MCTA's broad interest in a regional approach to pathways
- Progress on equity and social mobility outcomes
- Many active pathway projects occurring in Midwest states
- Registry and CTDL support for pathways, components, transfer value, and more
- Engagement and support across multiple industries and sectors
- Significant state technical investments in related software and services

# Research Findings: Midwest pathways

- As of August 19, 2021, identified and analyzed 691 pathways across the 12 Midwestern states
- Most are Career & Technical Education (CTE) pathways
- Pathways contain
  - Credentials 97%
  - Courses 62%
  - Occupations & jobs 52%
  - Organizations 49%
  - Transfer value & credits 46%
  - Competencies 41%
- Pathways are primarily divided by state lines. Exceptions include national and sector-based organizations (ACE, WICHE, Cyberseek)



# Research Findings: Technology

- Most pathways are documented as unstructured data
  - pdf 62%
  - web pages 29%
  - web forms 9%
- Many use templates for some consistency
- Pathway caveats are noted as comments
- Some broken links, especially for linked secondary sources
- Specialized products & services: CareerOneStop, EMSI, ISKME, Kuder, MappingYourFuture, MyNextMove, PCG Consulting, PTD Technology, RANDA, RoadTripNation, TES, Transferology, Vantage Point, XAP

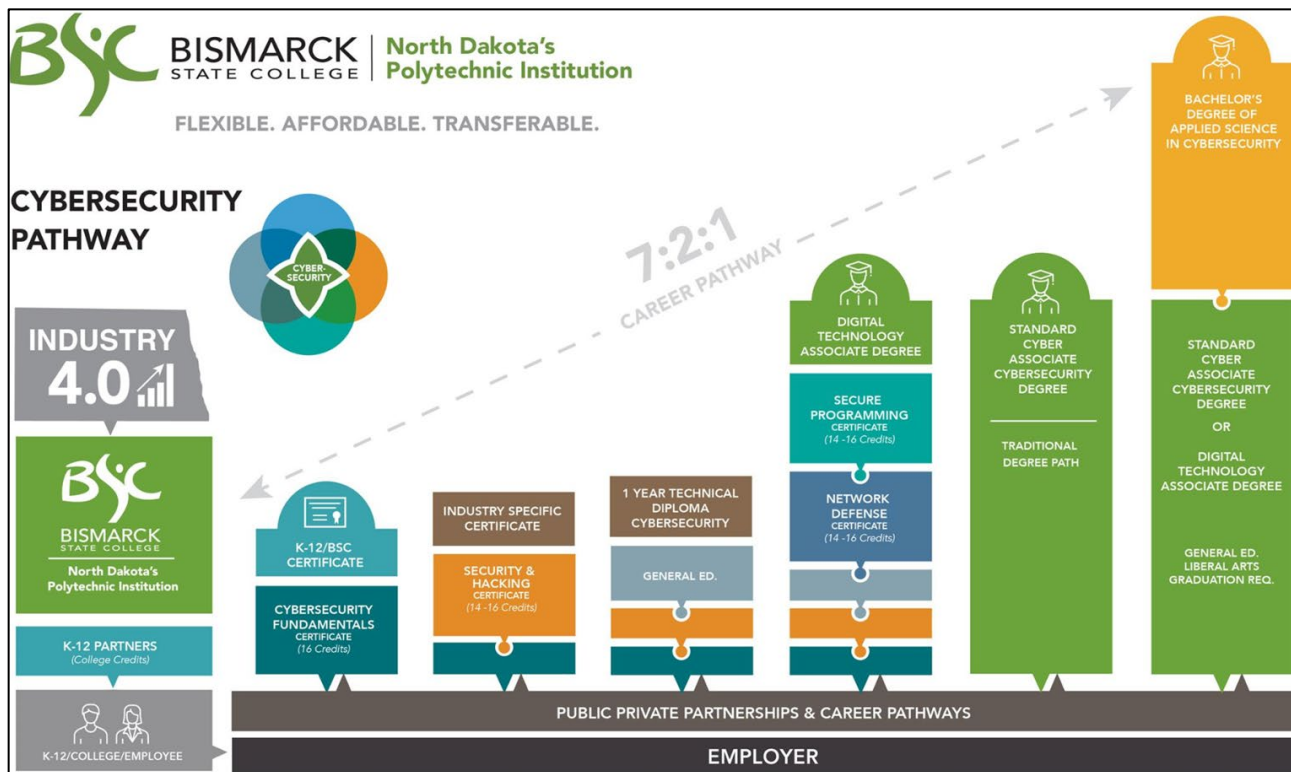


# Research Findings: CTDL Schema

- All pathways and components are supported by the CTDL schema
  - Organizations, credentials, learning opportunities, and pathways
  - Pathway components: Assessment, Basic, Cocurricular, Competency, Course, Credential, Extracurricular, Job, and Work Experience
  - Earnings and employment outcomes
  - Transfer value and credential connections
  - Quality assurance
- Confirmed pathway publishing with Bismarck State College's cybersecurity pathway using a bulk upload spreadsheet
  - Goal to have an integrated publishing workflow from source systems Campus Solution, CourseLeaf, and more



# Bismarck State College's cybersecurity pathway



Source: <https://bismarckstate.edu/uploads/248/Cyber%20K-12%20Partners%20Stack%20slide.jpg>



# Bismarck State College's cybersecurity pathway in Credential Registry

**CREDENTIAL FINDER** The Credential Finder is a tool for exploring all of the information published to the Credential Registry.

Search About

## Bismarck State College's cybersecurity pathway

Credential Engine Administration - Sandbox  
Last Updated Aug 13, 2021 12:19 PM

### Description

Bismarck State College's cybersecurity pathways provide skills that can immediately apply to the workplace for working adults already in the career of IT. The pathway options below are specifically designed to upskill you or your workforce and provided in a convenient online format at an affordable price. The courses within the pathway options apply towards an AAS in Cybersecurity and Computer Networks and BAS in Cybersecurity and Information Technology [Source](#)

### Progression Models

Cybersecurity Levels

### Pathway Components

Graph List Tree Registered

Some components require one or more other components via conditions. Each condition has a button. Click the button to show the components that are referenced by the condition.

Level Five				Level Six			
<p>Name: <b>Computer Networking Certificate</b></p> <p>Type: CredentialComponent Credential Type: Certificate Subject Webpage: View Source</p> <p>Description: Computer Networking Certificate</p>				<p>Name: <b>Digital Technology Associate Degree</b></p> <p>Type: CredentialComponent Credential Type: AssociateDegree Subject Webpage: View Source</p> <p>Description: Digital Technology Associate Degree</p> <p>Requires 5 of 5</p>			
<p>Name: <b>Security and Hacking Certificate</b></p> <p>Type: CredentialComponent Credential Type: Certificate Subject Webpage: View Source</p> <p>Description: Security and Hacking Certificate</p>				<p>Name: <b>AAS In Cybersecurity &amp; Computer Networks</b></p> <p>Type: CredentialComponent Credential Type: AssociateDegree Subject Webpage: View Source</p> <p>Description: This degree program combines system administration fundamentals with a foundation in</p>			
<p>Name: <b>Offensive and Defensive Security Certificate</b></p>							
						<p>Name: <b>BAS In Cybersecurity And Information Technology</b></p> <p>Type: CredentialComponent Credential Type: BachelorDegree Subject Webpage: View Source</p> <p>Description: This degree program provides a solid cybersecurity backing to inform tasks. Classes focus on best practices to implement, administer, and to process, transmit, and store data. Graduates gain hands-on experience in communications, configuring virtualization, managing cloud-based systems, and other common security-related tasks while administering daily IT operations. Experiences are constructed using continual feedback from local, regional, and industry cybersecurity practitioners. This feedback ensures students learn more and receive the latest in cybersecurity education. Upon graduation, students possess the knowledge and skills in the workforce of today and tomorrow. The classes in firewall implementation, virtualization, cloud computing, incident response, and data security. Students may have the opportunity to</p>	



Source: <https://sandbox.credentialengine.org/finder/detail/pathway/ce-28c803fa-0725-43ae-94ed-7cfecf3d86ce>

# Midwest Pathway Maturity Model

Current	Future
Pathways are hard to create & manage	Pathways are part of workflows
Pathways are outdated	Pathways are linked to labor market
Pathways are hard to find	Pathways are ubiquitous and widely accessible
Pathways are hard to understand	Pathways are understandable
Pathways have gaps	Pathways support decisions
Pathways are disconnected	Pathways are connected
Pathways are designed for a 'generic' user	Pathways support everyone

Padlet exercise:

How might we improve pathways  
across the Midwest?