Designing Credentialing Pathways in IT

A Case Study about Kirkwood Community College

workcred
an affiliate of ANSI

Kirkwood
COMMUNITY COLLEGE

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About the authors:

Workcred, Inc.
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Formed in 2014, Workcred is an affiliate of the American National Standards Institute (ANSI). Its mission is to strengthen workforce quality by improving the credentialing system, ensuring its ongoing relevance, and preparing employers, workers, educators, and governments to use it effectively. Workcred's vision is a labor market that relies on the relevance, quality, and value of workforce credentials for opportunities, growth, and development.

Kirkwood Community College
6301 Kirkwood Boulevard, SW
Cedar Rapids, Iowa 52404

www.kirkwood.edu

With more than 140 majors and programs, Kirkwood Community College boasts 16,000 annual college-credit students, while maintaining one of the lowest tuitions in the state. All degree-seeking students are eligible for federal financial aid and the college offers more than $3 million in scholarships each year to students from all walks of life. Kirkwood is a convenient, innovative and visionary educational leader that strives to remain affordable and accessible.

Grant funded by:

ECMC Foundation
444 S. Flower Street, Suite 2550
Los Angeles, CA 90071

www.ecmcfoundation.org

ECMC Foundation is a national foundation whose North Star goal is to eliminate gaps in postsecondary completion by 2040. The Foundation uses a spectrum of funding structures, including strategic grantmaking and program-related investments through Education Innovation Ventures, to invest in both nonprofit and for-profit ventures. In pursuit of system change, the Foundation's grantmaking and investing are concentrated on the three following strategic priorities: removing barriers to postsecondary completion; building the capacity of organizations, institutions and systems; and transforming the postsecondary ecosystem.

The views expressed herein are those of the authors and do not necessarily represent those of ECMC Foundation, its officers, or employees.

Grant partners:

Higher Learning Commission
230 S. LaSalle Street, Suite 7-500
Chicago, Illinois 60604-1411

www.hlcommission.org

HLC is an independent agency, founded in 1895, that accredits degree-granting colleges and universities in the United States. HLC is an institutional accreditor, accrediting the institution as a whole. HLC's mission is to advance the common good through quality assurance of higher education as the leader in equitable, transformative, and trusted accreditation in the service of students and member institutions.

The League for Innovation in the Community College
2040 S. Alma School Road, Suite 1-500
Chandler, Arizona 85286

www.league.org

The League for Innovation in the Community College (League for Innovation) is an international nonprofit organization with a mission dedicated to cultivating innovation in the community college environment by forging strategic partnerships and empowering individuals to drive educational transformation. Founded in 1968 by B. Lamar Johnson and a dozen U.S. community and technical college presidents, the League for Innovation has proudly served community college institutions for over 50 years.

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About Certification + Degree Pathways

The practice of embedding industry credentials like certifications into degrees (C+D pathways) is common at community colleges.[1] Embedding refers to a college's alignment of its degree curriculum with an industry credential, although the approach a college may take varies as it seeks to better serve its learners and leverage its existing resources. A 2017 study among 149 U.S. colleges and four-year institutions by Lumina Foundation found that the most commonly cited benefit of C+D pathways was that it enabled students to earn valuable industry and academic credentials at the same time.[2] The study also showed that C+D pathways helped colleges and universities align their curricula with prevailing industry standards.

Certifications are distinct from other credentials because they are awarded after an individual demonstrates acquisition of a set of skills through a standardized assessment (e.g., oral, written, or performance-based). Additionally, certifications must be renewed after a designated period of time and can be revoked for incompetence or unethical behavior. Individuals must meet qualifications such as training and experience that are required prerequisites to take the certification examination. Certifications are awarded and tracked by certification bodies—typically nonprofit organizations, professional associations, industry/trade organizations, or businesses. According to Credential Engine, more than 7,000 industry-recognized certifications are offered across numerous industry sectors including healthcare, education, finance, IT, cybersecurity, manufacturing, retail, and hospitality.[3]

1 Michael Prebil and Mary Alice McCarthy, *Building Better Degrees Using Industry Certifications Lessons from the Field* (New America, Education Policy, and Center on Education & Skills, September 17, 2018), **https://www.newamerica.org/education-policy/reports/building-better-degrees-using-industry-certifications**.

2 Holly Zanville, Kelly Porter, and Evelyn Ganzglass, *Report on Phase I Study: Embedding Industry and Professional Certifications within Higher Education* (Lumina Foundation, January 2017), **https://www.luminafoundation.org/files/resources/report-on-phase-i-study-embedding-industry-professional-certifications-within-higher-education-january-2017.pdf**.

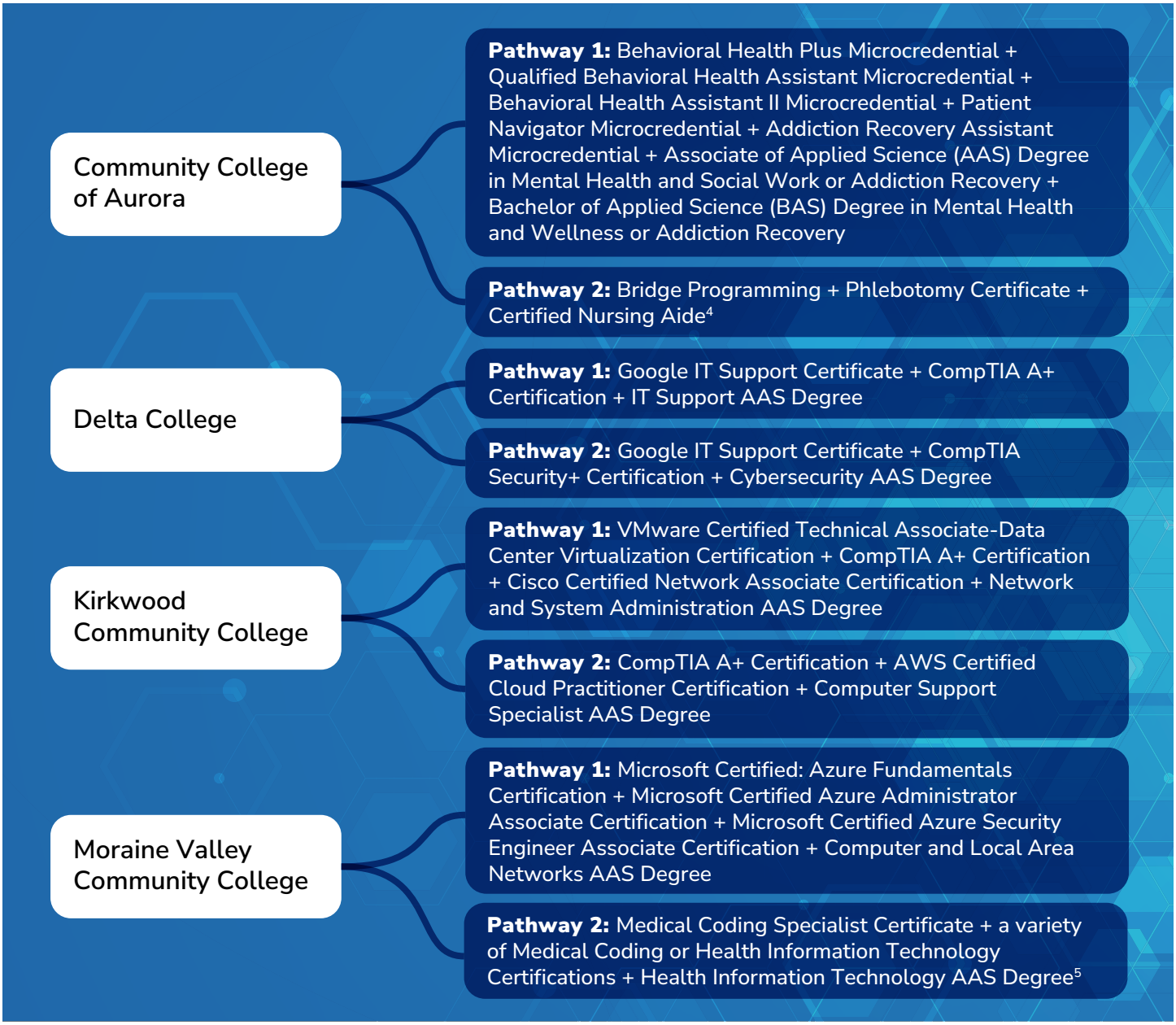
3 Counting U.S. Postsecondary and Secondary Credentials (Credential Engine, 2022), **https://credentialengine.org/wp-content/uploads/2023/01/Final-CountingCredentials_2022.pdf**.

About the Project

This project brought together a unique group of partners to explore effective ways to develop and launch new C+D pathways. Workcred, the Higher Learning Commission, and the League for Innovation in the Community College were joined in this endeavor by four community colleges—Community College of Aurora, Delta College, Kirkwood Community College, and Moraine Valley Community College.

Eight pathways, two at each institution, were developed as part of this project (see Figure 1).

Figure 1: Credential Pathways for Each Institution



4 Author's note: This pathway is currently paused due to instructor availability.

5 Author's note: Although this pathway was established prior to this project, it was included to highlight the need to obtain aggregate and/or student-level certification exam data results.

This case study is part of a series of four case studies developed to highlight all or some of the C+D pathways from each of the colleges that participated in this project. While each pathway was developed independently, there are common challenges and insights that were uncovered during this project. Further details can be found in the following related publications:

- **Creating Credentialing Pathways in Behavioral Health: A Case Study about Community College of Aurora**
- **Building Credentialing Pathways Using Credit for Prior Learning: A Case Study about Delta College**
- **How Certification Bodies Can Support Colleges' Efforts to Integrate Certifications into Academic Programs**
- **Medical Coding and Health Information Technology Pathways: A Case Study about Moraine Valley Community College**
- **Playbook for Certification + Degree Pathways**
- **Promising Practices: Certification Plus Degree Pathways**

The case study that follows focuses on the lessons learned from Kirkwood Community College to integrate third-party certifications and AAS degrees to create a network and system administration pathway and a computer support specialist pathway.

Developing IT Pathways

Figure 2: Kirkwood Community College Demographics[6]

College Demographics

Kirkwood Community College

6301 Kirkwood Boulevard, SW
Cedar Rapids, IA 52404

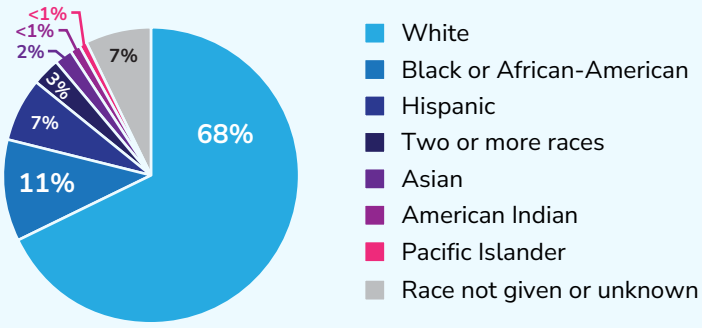
16,939 Total student enrollment

26% Percent of students who are Pell eligible

48% Percent of first-generation learners

19% Percent of adult (age 23+) learners

STUDENT DEMOGRAPHICS



Kirkwood Community College (Kirkwood) faculty developed two C+D pathways in IT, with each one consisting of multiple certifications and one AAS degree (see Figure 3).

The first pathway focuses on network and system administration (NASA), which is a fast-paced, challenging field that requires capable problem solvers to maintain computer networks that underpin businesses. Network and system administrators design, build, integrate, maintain, and secure local area networks, design and support server systems and software, and provide end-user support for LAN-based applications. Kirkwood developed a C+D pathway that includes an AAS degree in NASA, the CompTIA A+ certification, the CCNA certification, and the VMware Certified Technical Associate – Data Center Virtualization certification. The CompTIA A+ certification and the CCNA certification are considered foundational certifications for network administrators. Students will take the CompTIA A+ certification exam at the end of their first academic year and the VMware Certified Technical Associate – Data Center Virtualization and CCNA certification exams after their second year. However, as of June 30, 2025, Broadcom retired the VMware Certified Technical Associate – Data Center Virtualization exam, so Kirkwood is currently working with their industry advisory board to identify another certification to use in this pathway.

6 "Fact Book," Kirkwood Community College, accessed June 8, 2025, **https://www.kirkwood.edu/about-us/faculty-leadership/institutional-research/fact-book**; and Kirkwood Community College's Office of Institutional Research, email message to author, June 9, 2025.

7 Author's note: The VMware Certified Technical Associate – Data Center Virtualization certification exam was retired on June 20, 2025. Kirkwood is currently working with their industry advisory board to identify another certification to use in this pathway.

The computer support specialist (CSS) pathway combines customer service skills with a variety of IT knowledge that includes hardware, software, networking, and programming, as well as durable skills such as problem-solving and analytical thinking. In this pathway, the CompTIA A+ certification and AWS Cloud Practitioner certification are embedded in the CSS AAS degree. As in the other pathway, the CompTIA A+ certification was selected because it is an important foundational certification. The AWS Cloud Practitioner certification was identified by industry representatives on the advisory board as a certification that validates baseline knowledge of AWS cloud services and terminology. Learners will take certification exams at the end of their first academic year.

Faculty developed these pathways because while they were committed to offering learners a broad education in NASA or CSS, industry partners emphasized the value of job candidates earning certifications to hone in on specific skills. In developing this program, faculty anticipate that employers will value students with these certifications in hiring and promotion.

Figure 3: IT Pathways and Associated Degrees and Certifications

IT Pathways	Associate Degree	Certifications Integrated into the Pathways
Network and System Administration Pathway	Network and System Administration AAS	VMware Certified Technical Associate – Data Center Virtualization[7] CompTIA A+ Cisco Certified Network Associate (CCNA)
Computer Support Specialist Pathway	Computer Support Specialist AAS	CompTIA A+ Amazon Web Services (AWS) Cloud Practitioner

Partners

Multiple partners within Kirkwood who were involved in the development of these C+D pathways, including administrators, faculty, and students. For the pathways to be successful, it is critical that the program receives a future commitment from the college and/or local industry partners to support pathway development and sustainability. The dean of business and IT as well as the outreach coordinator were also closely involved in the development of the pathways.

Faculty within the NASA and CSS programs developed the curriculum for the courses in close partnership with the industry representatives on their advisory boards. Kirkwood was very deliberate in the selection of advisory

board members –many of whom work in IT across multiple industry sectors, represent both large and small employers, and span a broad array of roles, including technical, supervisory, and human resources/administrative roles.

The process for developing the pathways was fairly straightforward. Faculty and industry representatives from the advisory boards worked together to determine the core knowledge, skills, and abilities required for entry-level positions. Next, they used the Business & Industry Leadership Team (BILT) model developed by the National Convergence Technology Center[8] to review academic courses and degrees with regional employers. In addition, the faculty who focused on embedding the certification exams into the associate degree programs were required to have subject matter expertise that was aligned with at least one of the certification exams, though many had already earned the certification.

To ensure that C+D pathways would meet the needs of students, students working toward a NASA and/or CSS AAS degree were frequently asked to provide feedback, particularly about the certification exam and testing process.

Lessons Learned

As they developed the pathways and enrolled learners, Kirkwood faculty, staff, and administrators gained some important insights.

Understand the value of certifications in the labor market. There is a need for careful and regular consideration of the value of certifications in the labor market. Industry advisory board members served as an excellent source of feedback. And as technology is a quickly changing field, the needs of industry undoubtedly change. Additionally, certification bodies may retire a certification because certain skills are no longer relevant or have been replaced with new skills. As a result, it is critical that faculty and industry representatives stay in regular communication, helping to ensure that the pathways include the most relevant skills and certifications. For example, after the pathways were launched, Kirkwood faculty adjusted the certification offerings by adding the VMWare Certified Technical Associate – Data Center Virtualization certification to the NASA pathway, something that both industry and faculty felt would benefit the learners and provide more career opportunities. And now they are working again with their advisory boards to find a replacement certification that will still benefit learners.

"Because of the grant, many students pursued and earned industry-recognized certifications that they likely would not have attempted otherwise, significantly increasing their career readiness and confidence."

– Bryan Bennett, lead faculty computer support specialist, Kirkwood Community College

8 "Building Pathways to Innovation Through Strategic Employer Engagement," Pathways to Innovation, accessed June 18, 2025, **https://www.pathwaystoinnovation.org**.

Integrate certification exam content domains and skill sets into classroom assignments. Incorporating subject matter from the knowledge areas assessed on the certification exams into the pathways curriculum and coursework helped ensure that all learners were able to gain the competencies needed before being tested in the certification exam. Importantly, faculty were not teaching students simply to pass the certification exam, but were developing the skill sets that industry partners had identified as being critical to their occupations.

Some of the information provided by certification bodies can be useful resources for faculty. For example, faculty can use the CompTIA A+ certification course objectives, which are published by CompTIA and posted on its website, to ensure that the academic curriculum aligns with the exam objectives. By reviewing the CompTIA A+ exam core I objectives, faculty can see that the exam covers five domains of knowledge: mobile devices, networking, hardware, visualization and cloud computing, and hardware and network troubleshooting. Each of the domain areas are broken down into specific objectives that a candidate for the certification should know and be able to do.

Integrate exam preparation strategies into the pathway. To earn a certification, learners must pass a standardized assessment. For many learners, this may be one of the first experiences with a third- party, standardized assessment. Others may have not taken a standardized assessment for a long time, or may not have had access to test preparation materials or courses. Given these scenarios, it was quickly identified as beneficial that all learners are provided with access to certification exam preparation. Ideally, the preparation should cover exam content and what to expect in terms of the environment in which the test is administered. Attention to both will increase learners' chances to pass a certification exam.

When the pathways were first being developed, faculty offered different approaches to exam preparation, which contributed to varying learner pass rates on the certification exam. In response, learners provided feedback to faculty about the need to provide additional support focused on standardized test-taking skills, time management to ensure learners complete the exam in the allotted amount of time, familiarity with different types of exam questions, and becoming comfortable in a standardized testing environment. After analyzing the certification completion rates, faculty members identified additional test preparation lessons and tools to implement for all the certification exams. One outcome is that faculty now incorporate certification practices tests as part of the pathways, with the goal of a higher level of certification exam success for all learners.

Develop additional lab work to assist students with exam prep. Faculty recognized that some learners needed additional practice to help them prepare for the certification exam. To address that need, faculty developed additional bootcamps to provide students with the opportunity to strengthen their skills, gain greater familiarity with the testing environment, and work in groups that promote peer-to-peer learning. This has been particularly helpful with some of the more challenging certifications, such as the CCNA. As an example, learners used the exam preparation materials from Boson throughout the semester to prepare for the CCNA exam, which gave learners a chance to simulate the exam experience with 300 questions available in the test banks.

After the semester was over, students were provided four days spread over two weeks to come to Kirkwood to practice skills and strengthen weaknesses. In addition, learners were provided with an additional 300 questions,

which were selected around topics students identified as areas in which they did not feel comfortable. The additional test questions were spread across three different "exams" to allow for extra practice to help students improve their skills so that they would have greater success on the certification exam.

Become an on-site testing center for certification exams. To help reduce as many barriers as possible for learners to take a certification exam, there should be a testing center on campus. Kirkwood partnered with Pearson VUE to become an on-site testing center. This allowed learners enrolled in Kirkwood programs to take the certification exams at an on-campus location. Prior to offering an on-campus testing center, the nearest testing center was a 90-minute drive from campus, which discouraged some learners from taking the exam. Some learners also had challenges with online testing at home, such as having someone unexpectedly enter the testing room, which would automatically disqualify the candidate. An on-campus testing center provides learners with a familiar, easy-accessible, and easier controlled location for testing. Since implementing this testing center, Kirkwood has found that the number of learners taking the certification exams has increased and has led to more pathway completion.

Schedule the certification exam during class time. Recognizing that learners have busy lives and it is sometimes difficult to find a time outside of set class hours for additional commitments, faculty decided to use a class period to administer the certification exam at the on-site testing center. Offering testing during a time when the learner has already planned to be in class also increased the number of learners who took the exam and completed the pathway.

Support faculty to earn the certification. There is significant value in having faculty earn a certification as part of the pathway development process. Prior to the implementation of the pathway, many faculty members had not earned the certification. Earning the certification at the outset of the pathway, faculty gained a greater appreciation for the exam preparation process and the exam questions and setting itself, and thus could relate more to students.

Develop a tracking tool for certification completion. There is no centralized clearinghouse to track whether learners pass a certification exam. Since certifications are credentials issued by third-party organizations, the faculty must rely on learners to share results, which is a difficult and burdensome process. Additional work must be done to address this challenge so that college faculty and administrators can more easily access reliable on information about individual certification exam pass rates.

Build student confidence and increase access to certifications. Embedding certifications into academic degree programs serves as a strategy to build student confidence. Since some of these certifications are embedded after the first year, students can validate their progress in gaining skills and knowledge that are valued in the labor market. Success on the certification exam also encourages students to continue their education, thus serving as a retention strategy. In addition, many students shared that they would not have been able to obtain the certifications unless they were embedded in the pathway. Therefore, the pathways provide more opportunities for all students to access the skills and certifications that are valued by employers.

Evaluation

Kirkwood is focused on ensuring that these pathways continue to meet the needs of the learners, the college, and regional industry partners. Kirkwood will continue to track C+D pathway enrollments, the number of students who take the certification exams, and the certification pass rates for the learners. In addition, information will continue to be gathered from industry partners to validate the value of the pathways and the certifications that are embedded in the programs. This information will be gathered through bi-annual industry partner feedback through the College Advisory Council, employer surveys, community conversations, feedback from employers who provide student internships and hire students, local job postings, regional skills assessment surveys, and experiences from program alumni. The information gathered from both learners and industry partners is critical to ensure that the pathways remain relevant, include the right certifications, and identify any gaps in the pathway or in the ability of the learners to pass the certification exams and gain the skills needed by employers.

Sustainability Plans

One of the critical issues for sustainability is finding financial resources to cover the cost of the certification exams. For example, the CompTIA A+ certification consists of two exams that each cost $265, while the AWS Cloud Practitioner certification costs $100 and the CCNA exam is $300. That equals almost $1,000 extra that a student needs to pay to complete these pathways, which could become a barrier to pathway completion.

In addition, there are costs to maintain the on-site testing center to meet the standards required by Pearson VUE, which include testing room equipment with enhanced security protocols. Kirkwood faculty are sharing their work with vendors to identify opportunities to cover these expenses in the future and thus maintain pathway sustainability.

"The grant served as a vital catalyst for Kirkwood, providing essential financial resources that enabled transformative changes in curriculum, processes, and facilities—advancements that would have taken years to achieve without such support. Beyond jump-starting progress, the grant also established a sustainable foundation of resources that the college can continue to build upon as it grows and evolves."

– Tamara Alt, dean of business and IT, Kirkwood Community College

Conclusion

Kirkwood developed two IT C+D pathways that provide learners with the skills they need to be successful in the labor market. By incorporating third-party certifications into academic degree programs, learners benefit from earning the broad-based skills from an academic degree program and backed this knowledge with industry recognition of the technical and occupational specific skills assessed on a certification exam. The combination of these two types of credentials provides learners with multiple ways to document their skills and more opportunities to pursue their career goals.

Key Resources

Listed below are resources about the C+D pathway programs at Kirkwood Community College and information about the certifications that were included.

Kirkwood Community College

CSS AAS Degree Program: **https://www.kirkwood.edu/programs/degrees/stem-it/computer-support-specialist**

NASA AAS Degree Program: **https://www.kirkwood.edu/programs/degrees/stem-it/network-system-administration**

Certifications

AWS Cloud Practitioner: **https://aws.amazon.com/certification/certified-cloud-practitioner**

- AWS Certified Cloud Practitioner (CLF-C02) Exam Guide: **https://d1.awsstatic.com/onedam/marketing-channels/website/aws/en_US/certification/approved/pdfs/docs-cloud-practitioner/AWS-Certified-Cloud-Practitioner_Exam-Guide.pdf**

CCNA: **https://www.cisco.com/site/us/en/learn/training-certifications/certifications/enterprise/ccna/index.html**

- CCNA Exam Topics: **https://learningnetwork.cisco.com/s/ccna-exam-topics?ccid=ccnacert-guide&dtid=ebook&oid=ccna-cert-guide**
- CCNA Exam and Training Resources: **https://www.cisco.com/site/us/en/learn/training-certifications/certifications/enterprise/ccna/exams-and-training.html**

CompTIA A+ Certification: **https://partners.comptia.org/certifications/a**

- CompTIA A+ Certification Exam Core 1 Objectives (V15): **https://www.comptia.org/en-us/certifications/a/core-1-v15/#objectives**
- CompTIA A+ Certification Exam Core 2 Objectives (V15): **https://www.comptia.org/en-us/certifications/a/core-2-v15/#objectives**

VMware Certified Technical Associate – Data Center Virtualization: **https://www.broadcom.com/support/education/vmware/certification/vcp-dcv**

- VMware Certified Technical Associate – Data Center Virtualization Exam Blueprint: **https://docs.broadcom.com/doc/vmw-vcp-dcv-8-exam-guide**