# Cloud Computing A.A.S.

Career Community: Computer, Engineering, Manufacturing and Information Technology
Curriculum Code: 1839
Effective: Fall 2025 – Summer 2030

## Purpose of the Major

Cloud computing provides remote computing resources that leverage virtualization technologies to create business solutions that are scalable, performant, and cost-effective. Students learn to design, create, maintain, and automate cloud environments with architectures that promote security and efficiency using services from industry leaders. This degree integrates several fields within information technology, including networking, programming, cybersecurity, databases, and artificial intelligence. Students completing this curriculum may also be eligible to apply for the certificate of completion in Cybersecurity Foundations (1833). Not all courses in this program transfer to all colleges. Students planning to transfer should see an academic advisor before enrolling in any course.

## Milestone

In addition to the required General Education courses in Math and English, completion of CITP 110 with a 2.0 or higher is a key component for success in completing this program. Knowledge obtained in these courses is the foundation for learning in other required courses. Students are encouraged to contact their faculty if they need additional assistance with learning the concepts presented in these courses.

## Additional Information

Students select one subspecialty from the following options:

A. Artificial Intelligence/Machine Learning Operations (AIOps/MLOps)
B. Full-Stack Development (Web) with C#
C. Full-Stack Development (Web) with Java
D. Security/System Operations (SecOps/SysOps)

## Contact Information

For further information, including about career options, course substitutions and waivers, etc., contact the Computer Information Technologies Program in the West Campus Building, Room M103, telephone number 517-267-6406 or Student Services West Campus, West Campus Building, Room M016, telephone number 517-267-5452.

## Major Required Courses – *A minimum grade of 2.0 is required for General Education courses.*

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| ACAD 100 | First Year Experience | 1 / 1 |
| CITD 120 | SQL Concepts | 3 / 3 |

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| CITI 100 | AI Foundations | 3 / 3 |
| CITN 280 | IT Security Foundations | 3 / 3 |
| CITO 100 | Cloud Foundations with AWS | 3 / 3 |
| CITO 120 | Cloud Architecting with AWS | 3 / 3 |
| CITO 140 | Cloud Development Ops with AWS | 3 / 3 |
| CITP 110 | Intro to Programming-Python | 4 / 4 |
| CITS 110 or<br>COMM 110 or<br>COMM 120 or<br>COMM 130 or<br>COMM 200 or<br>COMM 240 or<br>COMM 260 or<br>ENGL 122 or<br>ENGL 132 | Helpdesk Support Specialist<br>Communication in the Workplace<br>Dynamics of Communication<br>Fundamentals Public Speaking<br>Small Group Communication<br>Interpersonal Communication<br>Nonverbal Communication<br>Composition II<br>Honors Composition II | 3 / 3<br>3 / 3<br>3 / 3<br>3 / 3<br>3 / 3<br>3 / 3<br>3 / 3<br>4 / 4<br>4 / 4 |
| CITS 225 | Networking for PC Technicians | 3 / 3 |
| ENGL 121 or<br>ENGL 124 or<br>ENGL 127 or<br>ENGL 131 | Composition I<br>Technical Writing<br>Business Writing<br>Honors Composition I | 4 / 4<br>3 / 3<br>3 / 3<br>4 / 4 |
| MATH 120 or<br>MATH 126 or<br>MATH 141 or<br>STAT 170<br>STAT 215 | College Algebra<br>Precalculus<br>Caliculus with Applications<br>Introduction to Statistics<br>Intro to Probability and Stats | 4 / 4<br>5 / 5<br>4 / 4<br>4 / 4<br>4 / 4 |

Notes:

ACAD 100 may be waived when students meet one of the following College-approved waiver criteria:
- Completion of 12 college-level credits with minimum grades of 2.0 shown on the LCC transcript (including transfer, if applicable), or
- Employment in the field of, or a field related to, the degree being sought, or
- For Health Careers students, successful completion of CHSE 100.

Students wishing to waive ACAD 100 should contact their advisor.

Students following specific articulation agreements with Eastern Michigan University in Cybersecurity choose STAT 170 or with Northwood University in Cybersecurity choose MATH 120. All other students considering future transfer should choose the highest MATH or STAT course into which they place to maximize options.

Please check with specific institutions to determine whether courses transfer or not. Generally speaking, ENGL 121, ENGL 122, STAT 170, SOCL 120, and BIOL 120 provide more transfer options, but this varies by institution.

## Major Required Courses, Limited Choice – Humanities and Fine Arts or Social Sciences or Applied Social Sciences *- Select one as recommended or select one from* [LCC General Education Applied Degrees:](#) *Humanities and Fine Arts or Social Sciences or Applied Social Sciences. A minimum grade of 2.0 is required for General Education courses.*

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| ANTH 270 | Cultural Anthropology | 3 / 3 |
| ARTS 102 | 2D Design | 3 / 4 |
| ECON 201 | Principles of Economics-Micro | 4 / 4 |
| ECON 202 | Principles of Economics-Macro | 4 / 4 |
| GEOG 200 | World Regional Geography | 4 / 4 |
| MGMT 234 | Diversity in the Workplace | 3 / 3 |
| POLS 201 | Intro to Political Science | 3 / 3 |
| SOCL 120 | Introduction to Sociology | 4 / 4 |

Notes: Students considering future transfer, choose ANTH 270, GEOG 200, POLS 201, or SOCL 120.

## Major Required Courses, Limited Choice – Natural Sciences or Applied Sciences and Technology Lab *- Select one as recommended or select one from* [LCC General Education Applied Degrees:](#) *Natural Sciences or Applied Sciences and Technology Lab. A minimum grade of 2.0 is required for General Education courses.*

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| BIOL 120 | Environmental Science | 4 / 6 |
| CHEM 135 | Chemistry in Society | 4 / 5 |
| GEOL 230 | Environmental Geology | 4 / 6 |
| ISCI 131 | Integrated Physical Science | 4 / 6 |
| PHYS 120 | The Art of Physics | 4 / 5 |

Notes: Students considering future transfer to Central Michigan University choose BIOL 120.

## Major Required Courses, Limited Choice - *Select one course, minimum of 3 credits*

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| CITF 120 | Operating Systems Concepts | 3 / 3 |
| CITS 125 | Computer Support: A+ Cert Prep | 6 / 6 |

**Major Required Courses by Subspecialty** –*Select one concentration (A, B, C, or D) and complete all courses listed for that subspecialty.*

### A. AI/Machine Learning Operations (AIOps/MLOps) Subspecialty

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| CITI 120 | Data Analysis with Python | 3 / 3 |
| CITI 140 | Intro to Machine Learning | 3 / 3 |
| CITI 210 | Natural Language Processing | 3 / 3 |
| CITI 220 | Computer Vision | 3 / 3 |
| CITO 240 | Machine Learning with AWS | 3 / 3 |

### B. Full-Stack Development (Web) with C# Subspecialty

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| CITP 140 | Software Testing | 3 / 3 |
| CITP 180 | Intro to C#.NET Programming | 4 / 4 |
| CITP 280 | Advanced C#.NET Programming | 4 / 4 |
| CITW 160 | Web Development HTML & CSS | 3 / 3 |
| CITW 165 | Web Development JavaScript | 3 / 3 |

### C. Full-Stack Development (Web) with Java Subspecialty

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| CITP 140 | Software Testing | 3 / 3 |
| CITP 190 | Intro to Programming in JAVA | 4 / 4 |
| CITP 290 | Adv JAVA Programming for Busn | 4 / 4 |
| CITW 160 | Web Development HTML & CSS | 3 / 3 |
| CITW 165 | Web Development JavaScript | 3 / 3 |

### D. Security/System Operations (SecOps/SysOps) Subspecialty

| Course Code | Course Title | Credit / Billing Hours |
|---|---|---|
| CITC 282 | Ethical Hacking | 3 / 3 |
| CITC 285 | System Defense | 3 / 3 |
| CITC 287 | Cybersecurity Incident Respons | 3 / 3 |
| CITF 140 | Information Technology Ethics | 3 / 3 |
| CITN 230 | Linux Operating System | 3 / 3 |

## General Education – Applied Degrees

- English Composition or Applied English
  Major Required Courses meet this requirement.
- English Composition (second course)/Communication or Applied Communication
  Major Required Courses meet this requirement.
- Humanities and Fine Arts or Social Sciences or Applied Social Sciences
  Major Required Limited Choice Courses meet this requirement.
- Mathematics or Applied Mathematics
  Major Required Courses meet this requirement.
- Natural Sciences Lab or Applied Sciences and Technology Lab
  Major Required Limited Choice Courses meet this requirement.

## Additional Credits

After completing the course and credit requirements as noted on this pathway, students who fall short of the 60-credit minimum required for an Associate Degree may select any course(s) needed to reach 60 credits, except those courses noted in number 7 in the Institutional Requirements for Associate Degrees. Students are encouraged to use Degree Works and meet with an Advisor to ensure all requirements are met and for course recommendations.

## Minimum Total Credit Hours

60 credits / 61 billing hours

## Recommended Full-Time Course Sequence

| Semester I |
| --- |
| ACAD 100 |
| CITI 100 |
| CITF 120 or CITS 125 |
| CITP 110 – Milestone course |
| MATH 120 or MATH 126 or MATH 141 or STAT 170 or STAT 215 |

| Semester II |
| --- |
| CITD 120 |
| CITO 100 |
| CITS 225 |
| Limited Choice - Select the course for your subspecialty<br>A. CITI 120<br>B. CITP 140<br>C. CITP 140<br>D. CITF 140 |
| Limited Choice - Select the course for your subspecialty<br>A. CITI 140<br>B. CITW 160 |

| Semester II |
| --- |
| C. CITW 160 |
| D. CITC 287 |

| Semester III |
| --- |
| CITN 280 |
| CITO 120 |
| CITO 140 |
| ENGL 121 or ENGL 124 or ENGL 127 or ENGL 131 |
| Limited Choice - Select the course for your subspecialty<br>A. CITI 210<br>B. CITP 180<br>C. CITP 190<br>D. CITN 230 |

| Semester IV |
| --- |
| CITS 110 or COMM 110 or COMM 120 or COMM 130 or COMM 200 or COMM 240 or COMM 260 or ENGL 122 or ENGL 132 |
| Limited Choice - Humanities and Fine Arts or Social Sciences or Applied Social Sciences |
| Limited Choice - Natural Sciences Lab or Applied Sciences and Technology |
| Limited Choice - Select the course for your subspecialty<br>A. CITI 220<br>B. CITP 280<br>C. CITP 290<br>D. CITC 282 |
| Limited Choice - Select the course for your subspecialty<br>A. CITO 240<br>B. CITW 165<br>C. CITW 165<br>D. CITC 285 |

## Recommended Part-Time Course Sequence

| Semester I |
| --- |
| ACAD 100 |
| CITP 110 – Milestone course |
| ENGL 121 or ENGL 124 or ENGL 127 or ENGL 131 |

| Semester II |
| --- |
| CITD 120 |
| CITS 110 or COMM 110 or COMM 120 or COMM 130 or COMM 200 or COMM 240 or COMM 260 or ENGL 122 or ENGL 132 |

| Semester III |
| --- |
| CITF 120 or CITS 125 |

| Semester IV |
| --- |
| CITS 225 |
| Limited Choice - Humanities and Fine Arts or Social Sciences or Applied Social Sciences |

| Semester V |
| --- |
| CITI 100 |
| MATH 120 or MATH 126 or MATH 141 or STAT 170 or STAT 215 |

| Semester VI |
| --- |
| CITO 100 |
| Limited Choice - Natural Sciences Lab or Applied Sciences and Technology |

| Semester VII |
| --- |
| CITO 120 |
| Limited Choice - Select the course for your subspecialty<br>A. CITI 120<br>B. CITP 140<br>C. CITP 140<br>D. CITF 140 |

| Semester VIII |
| --- |
| CITO 140 |
| Limited Choice - Select the course for your subspecialty<br>A. CITI 140<br>B. CITW 160<br>C. CITW 160<br>D. CITC 287 |

| Semester IX |
| --- |
| CITN 280 |
| Limited Choice - Select the course for your subspecialty<br>A. CITI 210<br>B. CITP 180<br>C. CITP 190<br>D. CITN 230 |

| Semester X |
| --- |
| Limited Choice - Select the course for your subspecialty<br> A. CITI 220 |

| Semester X |
| --- |
| B. CITP 280 |
| C. CITP 290 |
| D. CITC 282 |
| Limited Choice - Select the course for your subspecialty |
| A. CITO 240 |
| B. CITW 165 |
| C. CITW 165 |
| D. CITC 285 |

*LCC makes every effort to limit revisions to the pathways during their effective timeframe. However, the College reserves the right to update certificate and degree titles, and make course changes as needed, without prior notice. The College also reserves the right to discontinue programs when warranted.*