

IT-1026: INTRODUCTION TO COMPUTING

Cuyahoga Community College

Viewing: IT-1026 : Introduction to Computing

Board of Trustees:

January 2026

Academic Term:

Fall 2026

Subject Code

IT - Information Technology

Course Number:

1026

Title:

Introduction to Computing

Catalog Description:

Introduces students to computing including networking, software engineering, databases, web programming, computer architecture, security, ethics, and career awareness through hands-on projects and inquiry.

Credit Hour(s):

3

Lecture Hour(s):

2

Lab Hour(s):

2

Requisites

Prerequisite and Corequisite

None.

Outcomes

Course Outcome(s):

Apply knowledge of computer networking and programming concepts to succeed in upper-level coursework and to build a foundation in secure software development.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Civic Responsibility: Analyze the results of actions and inactions with the likely effects on the larger local and/or global communities.

Cultural Sensitivity: Demonstrate sensitivity to the beliefs, views, values, and practices of cultures within and beyond the United States.

Objective(s):

1. Differentiate the components of an information system and examine the history of computing.
2. Demonstrating an understanding of computing ethics, legal considerations, civic responsibility, and cultural awareness as it applies to computing.
3. Distinguish and evaluate various types of computer hardware, examine data representation, compute data conversions, and identify network communications methodologies.
4. Differentiate computer software including operating systems, graphics, cloud computing, virtualization, file structure, and software development tools.
5. Describe the software development life cycle as it applies to software engineering, specifically Object-Oriented Programming, and diagram and implement programming logic.
6. Identify information security tools and encryption methodologies as well as the supporting network protocols.

7. Articulate the components of Internet architecture including URLs and file paths and, create a web page using current web development technologies.
8. Describe the various types of databases including the process of normalization and create basic SQL statements in response to business problems.

Course Outcome(s):

Develop an awareness of careers in IT and explore the paths to these careers.

Essential Learning Outcome Mapping:

Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Demonstrate an understanding of careers in computing and the academic and professional support services available to assist in achieving career goals.
2. Formulate a resume appropriate for a job application.

Methods of Evaluation:

1. Discussion
2. Hands-on practice
3. Quizzes
4. Group and independent projects

Course Content Outline:

1. History of computing and computers
 - a. Origins of computing machines
 - b. History of operating systems
2. Data Storage
 - a. Memory organization and capacity
 - b. Binary and hexadecimal representation and their uses
 - c. Mass storage technologies
 - d. Bit patterns
 - e. Data compression
3. Computer Architecture
 - a. CPU / Processors
 - b. Arithmetic / Logic instructions
 - c. Memory
 - d. Peripheral devices
 - e. Gates and circuits
4. Operating system architecture
 - a. Computer operating systems
 - b. File structure
 - c. Command-line access and use, including directory listing, creation, and traversal
 - d. Absolute vs. relative file paths
 - e. Virtualization
5. Networking
 - a. Network classifications and topologies
 - b. Protocols including HTTP, HTTPS, SSL, and FTP
 - c. Internet architecture
 - i. Client-server relationship
 - ii. Cloud computing
 - d. Terminology, including but not limited to packet, packet-switching, IP address, DNS, and URL components
 - e. Networking hardware

- i. Routers
 - ii. Switches
 - iii. Hubs
- f. Internet protocols
 - i. TCP and OSI models
 - ii. IP and IP versions
- g. Encryption and Security
 - i. Authentication
 - ii. Security Triad
 - iii. ACL and RBAC
 - iv. Ciphertext
 - v. Public and private encryption/decryption keys
 - vi. Cryptography
 - vii. Frequency Fingerprint
 - viii. Caesar and Polyalphabetic Ciphers
 - ix. Brute-Force attacks
 - x. SQL-Injections
- 6. Software (includes but not limited to) - explain and practice:
 - a. GitHub version control software
 - b. Screen capture
 - c. Compression, such as WinZip
 - d. Graphics software such as Vectr to create a logo for use in Web development
 - e. Diagramming software such as Visio or Lucidchart to create:
 - i. Networking topology using Cisco symbols
 - ii. Programming flowchart
 - iii. UML Class diagram to depict classes, inheritance, and modularity
 - f. Web development: HTML, XML, and CSS
 - i. HTML basic tags including but not limited to: html, head, title, body, p, h1-h6, anchor and img
 - ii. Color representation
 - iii. External, internal, and inline CSS
 - g. Structured Query Language including:
 - i. SELECT statements with inclusive and specific field criteria
 - ii. Tuple limits with WHERE clauses for numeric and string data
 - iii. ORDER BY clause
 - h. Python programming including but not limited to methods, properties, variables, variable types, concatenation, assignment statements, functions, and decision structures
- 7. Algorithm representation
 - a. Pseudocode
 - b. Flowcharts
 - c. UML
- 8. Computer programming
 - a. Methodologies (includes but not limited to procedural and object-oriented)
 - b. Object-oriented concepts
 - i. Classes, objects, properties, and methods
 - ii. Inheritance
 - c. Data types and storage
 - d. System analysis and design
 - e. Software engineering
 - f. Artificial Intelligence
 - i. Generative AI
 - ii. ML (Machine Learning) and AI
 - iii. Artificial Narrow Intelligence (A.N.I)
 - iv. Artificial General Intelligence (A.G.I)
 - v. Artificial Super Intelligence (A.S.I)
 - vi. Chat-bots
 - vii. Intelligent Agents
 - viii. Natural Language Processing (NLP)
 - ix. Expert Systems (ES)
- 9. Database Systems

- a. The relational model
 - b. Structured Query Language syntax
 - c. Database normalization
 - d. Relationship between data, information, and knowledge
 - e. Primary and foreign key relationships between tables
 - f. SQL, NoSQL, and Big Data technologies
10. Graphic modeling and rendering
- a. Raster vs. Vector graphics
 - b. Compression types
 - c. File formats
 - d. Image layers and properties
11. Legal and Ethical responsibilities in computing
- a. ACM (American Computing Machinery) - Code of Ethics
 - b. AUP (Acceptable Use Practices)
 - c. Intellectual Property and the WIPO (World Intellectual Property Organization)
 - d. Copyrights and Trademarks
 - e. COPPA, FERPA, and HIPAA
12. Career and continuous learning opportunities
- a. Exploration of careers in IT - Bureau of Labor Statistics
 - b. Tri-C Co-Op readiness requirements
 - c. Handshake (Online Job Board)
 - d. Tri-C degrees, certificates, and student organizations
 - e. Industry certifications including but not limited to CISCO and CompTIA
 - f. Professional organizations including but not limited to: IEEE, ACM, W3C, NSA/CSS, CERT/CISP, and WIPO

Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: <https://portal2.tri-c.edu/ReligiousAccommodation/ReligiousAccommodationForm>. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

Other Required Instructional Policies:

<https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf>

Weekly Schedule

	Topics
Week 1	Computing concepts: <ol style="list-style-type: none"> 1. Origins of computing machines 2. History of operating systems 3. Data storage and memory 4. Primary components of a computer system 5. Communication and network concepts, systems, and applications
Week 2	<ol style="list-style-type: none"> 1. Digital devices 2. Main components of a computer system and their functions 3. Input, output, and memory 4. Hardware trends - computer architecture 5. Environmental challenges associated with electronic waste 6. Gates and circuits
Week 3	<ol style="list-style-type: none"> 1. Bit patterns 2. Data representation - octal, decimal, binary, hexadecimal 3. Data conversions and their uses

Week 4	<ul style="list-style-type: none"> 1. Operating system architecture 2. File structure 3. Working with the command line 4. Absolute vs. relative file paths 5. Virtualization and cloud computing
Week 5	<ul style="list-style-type: none"> Software 1. Version control software such as GitHub 2. Screen Capture 3. File compression programs Legal and Ethical responsibilities in computing ACM (American Computing Machinery) - Code of Ethics AUP (Acceptable Use Practices) Intellectual Property and the WIPO (World Intellectual Property Organization) Copyrights and Trademarks COPPA, FERPA, and HIPAA
Week 6	<ul style="list-style-type: none"> Software continued: 1. Graphics and graphic file formats Raster vs. Vector graphics Compression types File formats Image layers and properties 2. Diagramming software such as Visio and Lucidchart Algorithm representation Pseudocode Flowcharts UML
Week 7	<ul style="list-style-type: none"> Software Development 1. Language types and purposes 2. Software development life cycle and variations of the approach 3. Logic visualization using Lucidchart or Visio
Week 8	<ul style="list-style-type: none"> Software Development Python programming: syntax, comments, methods, attributes, decision statements, looping, and arrays Data types and storage System analysis and design Software engineering
Week 9	<ul style="list-style-type: none"> Data & Database Fundamentals The relational model Database normalization Relationship between data, information, and knowledge Primary and foreign key relationships between tables SQL, NoSQL, and Big Data technologies
Week 10	<ul style="list-style-type: none"> Data & Database Fundamentals continued Structured Query Language syntax SELECT, FROM, WHERE, ORDER BY statements Boolean operator AND
Week 11	<ul style="list-style-type: none"> Networking: Encryption and Security: Authentication Security Triad ACL and RBAC Ciphertext Public and private encryption/decryption keys Cryptography Frequency Fingerprint Caesar and Polyalphabetic Ciphers Brute-Force attacks SQL-Injections

Week 12	<p>Networking Hardware: Network classifications and topologies Protocols including HTTP, HTTPS, SSL, and FTP Internet architecture Client-server relationship Cloud computing Terminology, including but not limited to packet, packet-switching, IP address, DNS, and URL components Networking hardware Routers Switches Hubs Internet protocols TCP and OSI models IP and IP versions</p>
Week 13	<p>Web development: HTML, XML, and CSS HTML basic tags, including but not limited to: html, head, title, body, p, h1-h6, anchor, and img Color representation External, internal, and inline CSS</p>
Week 14	<p>Career and continuous learning opportunities Exploration of careers in IT - Bureau of Labor Statistics Tri-C Co-Op readiness requirements Handshake (Online Job Board) Tri-C degrees, certificates, and student organizations Industry certifications, including but not limited to CISCO and CompTIA Professional organizations, including but not limited to: IEEE, ACM, W3C, NSA/CSS, CERT/CISP, and WIPO</p>
Week 15	<p>Artificial Intelligence Generative AI ML (Machine Learning) and AI Artificial Narrow Intelligence (A.N.I) Artificial General Intelligence (A.G.I) Artificial Super Intelligence (A.S.I) Chat-bots Intelligent Agents Natural Language Processing (NLP) Expert Systems (ES) AI Prediction Tools</p>
Week 16	<p>Finals Week</p>

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Required/Recommended Readings

1. Computer Concepts (<https://sites.google.com/view/cis007-oer-westhills/1-what-is-information-systems-information-concepts-it-vs-is/?authuser=0>)
2. Use a Troubleshooting Methodology for More Efficient IT Support (<https://www.comptia.org/en-us/blog/use-a-troubleshooting-methodology-for-more-efficient-it-support/>)
3. How a CPU Works (https://youtu.be/cNN_tTXABUA/)
4. CPU, Memory, Input & Output (<https://youtu.be/MMzdKTtUIFM/>)
5. Number System and Base Conversions (<https://www.geeksforgeeks.org/digital-logic/number-system-and-base-conversions/>)
6. Number Systems and Binary (<https://www.khanacademy.org/math/pre-algebra/applying-math-reasoning-topic/alternate-number-bases/v/number-systems-introduction/>)
7. What is an operating system (OS)? (<https://www.techtarget.com/whatis/definition/operating-system-OS/>)
8. Command Line for Beginners (<https://www.freecodecamp.org/news/command-line-for-beginners/>)
9. File Management (https://theecmconsultant.com/what-is-file-management/#google_vignette)
10. File Attributes in OS (<https://www.geeksforgeeks.org/operating-systems/file-attributes-in-os/>)
11. What is Application Software? (<https://www.geeksforgeeks.org/computer-science-fundamentals/what-is-application-software/>)
12. Visio Diagramming Software (<https://support.microsoft.com/en-us/office/video-what-is-visio-421b0c94-7ecf-4e62-8072-d27e04d24fe6/>)
13. What is GitHub? (<https://www.youtube.com/watch?v=w3jLJU7DT5E>)
14. Introduction to Python (https://www.w3schools.com/python/python_intro.asp) from w3schools.com
15. What is object-oriented programming? (<https://www.techtarget.com/searchapparchitecture/definition/object-oriented-programming-OOP/>)
16. What is a flowchart? (<https://www.lucidchart.com/pages/what-is-a-flowchart-tutorial/>)

17. Algorithm Flowcharts Examples (https://edraw.wondershare.com/algorithm-flowchart-examples.html?srsltid=AfmBOoqt840C_B6e1JCKW9u4u0YoXt8EpjmWKDUUsQMYEmR30b9rWnmke)
18. Pseudocode and Flowchart: Complete Beginner's Guide (<https://www.codecademy.com/article/pseudocode-and-flowchart-complete-beginners-guide/>)
19. Unified Modeling Language (UML) Diagrams (<https://www.geeksforgeeks.org/system-design/unified-modeling-language-uml-introduction/>)
20. Using Visio to create a flowchart (<https://support.microsoft.com/en-gb/office/make-a-visio-flowchart-to-visualize-a-process-e2bd6f2b-129c-43ba-9c6a-de487c275501/>)
21. Data (<https://data.folio3.com/blog/data-monetization-strategy/>) Monetization (<https://data.folio3.com/blog/data-monetization-strategy/>)
22. Big Data Basics (https://www.businesstechweekly.com/operational-efficiency/data-management/big-data-basics-understanding-big-data/#google_vignette)
23. Database backup: Methods and benefits (<https://www.fivetran.com/learn/database-backup/>)
24. Introduction to SQL (https://www.w3schools.com/sql/sql_intro.asp)
25. What is the digital divide? (<https://www.techtarget.com/whatis/definition/digital-divide/>)
26. ACM Code of Ethics and Professional Conduct (<https://www.acm.org/code-of-ethics/>)
27. What is the digital divide? (<https://www.techtarget.com/whatis/definition/digital-divide/>)
28. ACM Code of Ethics and Professional Conduct (<https://www.acm.org/code-of-ethics/>)
29. What is the digital divide? (<https://www.techtarget.com/whatis/definition/digital-divide/>)
30. ACM Code of Ethics and Professional Conduct (<https://www.acm.org/code-of-ethics/>)
31. What is a Network Protocol, and How Does it Work? (<https://www.comptia.org/content/guides/what-is-a-network-protocol/#:~:text=A%20network%20protocol%20is%20an%20established%20set%20of,play%20a%20critical%20role%20in%20modern%20digital%20communications>)
32. OSI Model (<https://youtu.be/Ca1jnqwzq0/>)
33. What is TCP/IP and How Does it Work? (If necessary, use your Tri-C email and agree to the terms) (<https://www.techtarget.com/searchnetworking/definition/TCP-IP/>)
34. Cryptography
 - What is cryptography? (<https://www.khanacademy.org/computing/computer-science/cryptography/crypt/v/intro-to-cryptography/>)
 - The Caesar Cipher (<https://www.khanacademy.org/computing/computer-science/cryptography/crypt/v/caesar-cipher/>)
 - Polyalphabetic cipher (<https://www.khanacademy.org/computing/computer-science/cryptography/crypt/v/polyalphabetic-cipher/>)
35. Internet and Browser Security (<https://www.comparitech.com/blog/vpn-privacy/browser-security-chrome-firefox-edge-safari/>)
36. What is a brute force attack? (<https://www.cloudflare.com/learning/bots/brute-force-attack/>)
37. SQL Injection (https://www.w3schools.com/sql/sql_injection.asp)
38. W3C (view the page content and watch the video) (<https://www.w3.org/standards/>)
39. HTML File Paths (https://www.w3schools.com/html/html_filepaths.asp)
40. What is a Web Browser and How Does it Work? (https://allaboutcookies.org/what-are-web-browsers/#google_vignette)
41. What is Web Technology? Definition & Examples 2025 (<https://www.virtubox.io/blog/what-is-web-technology/>)
42. HTML Introduction (visit the links from Introduction - Images) (https://www.w3schools.com/html/html_intro.asp)
43. Everything You Need to Know About Image Compression (<https://www.jotform.com/blog/everything-you-need-to-know-about-image-compression/>)
44. What is an image? (<https://www.techtarget.com/whatis/definition/image/>)
45. What is virtualization? (<https://www.redhat.com/en/topics/virtualization/what-is-virtualization/>)
46. Virtualization Fundamentals (video) (<https://youtu.be/Ci4jCxbRJY/>)
47. ML (Machine Learning) and AI (<https://www.w3schools.com/ai/default.asp>) (visit Into-Examples)
48. Generative AI (https://www.w3schools.com/gen_ai/)
49. ChatGPT-4 (https://www.w3schools.com/gen_ai/chatgpt-4/)
50. Google Bard (https://www.w3schools.com/gen_ai/bard/)
51. Harnessing AI, Behavioral Data Science for Smarter Consumer Platforms (<https://cacm.acm.org/blogcacm/harnessing-ai-behavioral-data-science-for-smarter-consumer-platforms/>)
52. ACM Communications: Artificial Intelligence and Machine Learning (repository containing the article above) (<https://cacm.acm.org/category/artificial-intelligence-machine-learning/>)

Resources for the Instructor

Schneider, G. Michael and Judith Gersting. *Invitation to Computer Science*. 8th ed. Cengage Learning, 2019.

Reynolds, George. *Ethics in the AI, Technology, and Information Age*. Roman & Littlefield Publishers, 2022.

O'Leary, Timothy, Linda O'Leary and Daniel O'Leary. *Computing Essentials 2021*. 28th ed. McGraw-Hill Education, 2021.

Hare, Kevin. *Computer Science Principles - The Foundation Concepts of Computer Science*. 12th ed. Atlanta: Yellow Dart Publishing, 2020.

Rainer, Kelly and Efraim Turban. *Introduction to Information Systems*. 8th ed. Wiley, 2020.

Additional Resources for the Instructor

Reading will be from one of the below recommended textbooks, as selected by the individual instructors.

1. Free Creative Commons course textbook - Information Systems for Business and Beyond (updated in 2020 to meet accessibility guidelines): <https://digitalcommons.biola.edu/open-textbooks/1/>
2. GitHub account creation and reference: <https://docs.github.com/en/free-pro-team@latest/github/getting-started-with-github/signing-up-for-a-new-github-account> (<https://docs.github.com/en/free-pro-team@latest/github/getting-started-with-github/signing-up-for-a-new-github-account/>)
3. Computer History: <https://learn.g2.com/history-of-computers> (<https://learn.g2.com/history-of-computers/>).
4. Browser-based software development: <https://replit.com/>
5. Browser-based software development and reference: <https://www.w3schools.com/> (<https://replit.com/>)
6. Software reference: <https://edu.gcfglobal.org/en/>
7. Python: <https://automatetheboringstuff.com/chapter1/>
8. Python OOP: <https://www.digitalocean.com/community/tutorials/how-to-construct-classes-and-define-objects-in-python-3> (<https://www.digitalocean.com/community/tutorials/how-to-construct-classes-and-define-objects-in-python-3/>)
9. Markdown language: <https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet>
10. Everyday Ethics for Artificial Intelligence: <https://www.ibm.com/watson/assets/duo/pdf/everydayethics.pdf>
11. Virtualization: <https://www.redhat.com/en/topics/virtualization/what-is-virtualization> (<https://www.redhat.com/en/topics/virtualization/what-is-virtualization/>)
12. Bureau of Labor Statistics: <https://www.bls.gov/ooh/occupation-finder.htm>
13. CompTIA Certification: <https://www.comptia.org/certifications/cybersecurity-analyst> (<https://www.comptia.org/certifications/cybersecurity-analyst/>)
14. Cisco Certifications: <https://www.cisco.com/c/en/us/training-events/training-certifications/certifications.html>
15. Tri-C Student Organizations: <https://www.tri-c.edu/student-life/student-clubs/index.html> (<https://www.tri-c.edu/student-life/student-clubs/>)
16. CCDC National Collegiate Cyber Defense Competition: <https://www.nationalccdc.org/index.php/competition/about-ccdc/mission> (<https://www.nationalccdc.org/index.php/competition/about-ccdc/mission/>)
17. Image File Compression: <https://www.jotform.com/blog/everything-you-need-to-know-about-image-compression/>
18. Vectr browser-based vector image creation software: <https://vectr.com/tmp/a23IZIDALX/e5DVroX4Pt/?modal=welcome> (<https://vectr.com/tmp/a23IZIDALX/e5DVroX4Pt/?modal=welcome>)
19. Lucidchart - Visio compatible browser-based diagram/flowchart creation software: <https://www.lucidchart.com/pages/>
20. Cryptography concepts and practice: <https://www.khanacademy.org/computing/computer-science/cryptography/modern-crypt/v/diffie-hellman-key-exchange-part-1> (<https://www.khanacademy.org/computing/computer-science/cryptography/modern-crypt/v/diffie-hellman-key-exchange-part-1/>)
21. Invent with Python - Hacking the Caesar Cipher with Brute-Force: <https://inventwithpython.com/cracking/chapter6.html>
22. ICANN Internet Protocols: <https://www.icann.org/en/system/files/files/ip-addresses-beginners-guide-04mar11-en.pdf>
23. TCP/IP Model: <https://www.icann.org/en/system/files/files/ip-addresses-beginners-guide-04mar11-en.pdf>
24. CERT/CISA - Securing Your Web Browser: <https://us-cert.cisa.gov/publications/securing-your-web-browser> (<https://us-cert.cisa.gov/publications/securing-your-web-browser/>)
25. World Wide Web Consortium (W3C): <https://www.w3.org/Consortium/facts> (<https://www.w3.org/Consortium/facts/>)
26. Big Data: <https://www.guru99.com/what-is-big-data.html#:~:text=Big%20Data%20is%20a%20collection,it%20or%20process%20it%20efficiently.> (<https://www.guru99.com/what-is-big-data.html#:~:text=Big%20Data%20is%20a%20collection,it%20or%20process%20it%20efficiently>)
27. Tri-C Career Services: <https://www.tri-c.edu/career-services/student-career-services/experiential-learning/index.html> (<https://www.tri-c.edu/career-services/student-career-services/experiential-learning/>)

28. Handshake (Online Job Board): <https://www.tri-c.edu/career-services/student-career-services/job-search-preparation.html>
(<https://www.tri-c.edu/career-services/student-career-services/job-search-preparation.html>)
29. IEEE: <https://www.ieee.org/about/ieee-history.html>
30. ACM: <https://www.acm.org>
31. World Intellectual Property Organization (WIPO): <https://www.wipo.int/about-wipo/en/>
32. Teaching Responsible Computing Playbook: <https://foundation.mozilla.org/en/what-we-fund/awards/teaching-responsible-computing-playbook> (<https://foundation.mozilla.org/en/what-we-fund/awards/teaching-responsible-computing-playbook/>)
33. Data Kind: <https://datakind.org> (<https://catalog.tri-c.edu><https://datakind.org>)

Top of page

Key: 5401