# CST1100 – Introduction to Computer Systems

## Course Description

**Credits/Hours:** 3 credits (2 hours lecture, 2 hours lab per week)  
**Course Overview:** This course provides a broad introduction to computer systems, covering the history and evolution of computing machinery, how data is represented and processed, and the organization of computer hardware and software. Students will learn about fundamental hardware components (CPU, memory, input/output), software layers including operating systems and file systems, and the basics of programming (from low-level machine language to high-level object-oriented design and algorithms). The course also introduces database management systems, computer networks (network types, TCP/IP, packet switching), and topics in computer ethics, security, and contemporary applications. As a designated writing-intensive course, CST1100 includes written assignments on computing topics and a final team project with an oral presentation. By the end of the semester, students will have a foundational understanding of how computer systems work and how to use common software applications productively.

## Required Textbook(s) and Resources

* [**Foundations of Information Systems**](https://openstax.org/details/books/foundations-information-systems) (OpenStax, 2025) – *Primary textbook (CC BY licensed).*
* [**Workplace Software and Skills**](https://openstax.org/details/books/workplace-software-skills) (OpenStax, 2023) – *Secondary textbook for labs (CC BY licensed).*.)
* **Additional Materials:** Instructor-provided open resources for specific topics (e.g. binary number systems, logic circuits) and access to CUNY CityTech library databases for research.

## Assessments and Assignments

* **Writing Assignments:** Short essays reflecting on ethical and societal issues in computing (e.g. impact of social networks, digital privacy). At least one individual paper (~3 pages) will be assigned mid-semester.
* **Lab Exercises:** Lab tasks to apply concepts – e.g. converting numbers between binary/hex/decimal, building simple algorithms in pseudocode, using Office applications (Word for reports, Excel for charts, Access for simple databases, PowerPoint for presentations). Lab work reinforces lecture topics and contributes to the course’s Writing Intensive requirement (through documentation and reports).
* **Exams:** Two in-term exams (Exam 1 and Exam 2), a Midterm, and a Final Exam. These tests include a combination of multiple-choice and short-answer questions and problem-solving exercises. *Exam 1* occurs in the early weeks covering foundational concepts; *Midterm Exam* (Week 7) covers all material through programming fundamentals; *Exam 2* (later in the term) focuses on operating systems and applications; the *Final Exam* (Week 15) is cumulative with an emphasis on the last modules.

**Project Options (choose one):**

1. Written Research Report
   * Deliverables: A formal written report (~10 pages per team, in proper academic format) and an oral presentation (using PowerPoint or equivalent) delivered in class during Week 14.
   * Requirements: The report must integrate data or examples (e.g., charts or a simple dataset analysis using Excel/Access/Jupyter Notebook) and properly cite sources (MLA format).
   * Skills Assessed: Teamwork, research skills, use of office software, writing ability, and understanding of the chosen topic.
2. Technical Coding Project
   * Deliverables: A working technical project (e.g., a simple program, simulation, or visualization tool) along with a short technical documentation report (~5–7 pages) and an oral presentation (using PowerPoint or equivalent) delivered in class during Week 14.
   * Requirements: The coding project must demonstrate application of computing concepts from the course and include documentation explaining design decisions, testing, and how the project connects to course topics. Code must be submitted in a well-organized format (with comments and instructions for running).
   * Skills Assessed: Teamwork, applied technical skills, problem-solving, software development practices, and understanding of the chosen topic.

**This capstone project allows teams to demonstrate their strengths in either research and analysis or applied technical implementation.**

**Grading Breakdown:** Participation/ labs 15%; Writing assignments 10%; Team project 15%; Exam 1 10%; Exam 2 15%; Midterm 20%; Final Exam 25%. *(Exact weights may be adjusted by instructor – total 100%.)*

## Weekly Schedule and Topics

Below is the 15-week schedule of topics, readings, and major activities. Each week includes **lecture topics**, required **readings** (chapter sections from the open textbook(s)), hands-on **lab work**, and key **assignments** or exams due. Page and chapter references correspond to the open textbooks listed above.

### Week 1: Introduction and History of Computers

* **Topics:** Course introduction and overview; **History and evolution of computing** – from early calculating devices to modern computers. Key milestones: the first computers (Eniac, UNIVAC), development of programming languages, personal computing revolution, rise of the Internet. Overview of how computers impact society and various fields.
* **Readings:** *Foundations of Information Systems*, Chapter 1 (Introduction to IS) – especially the section on the historical evolution of information systems and computing[[5]](https://openstax.org/books/foundations-information-systems/pages/1-1-introduction-to-information-systems#:~:text=,and%20operations%20of%20information%20systems)[[6]](https://openstax.org/books/foundations-information-systems/pages/1-1-introduction-to-information-systems#:~:text=It%E2%80%99s%20helpful%20to%20understand%20the,to%20process%20and%20manage%20information). *(This provides context on how computer systems developed over time and the role of computing in organizations.)*
* **Lab:** Computing environment setup and library orientation. Students familiarize themselves with CityTech online systems. Brief library research session on historical figures or inventions in computing (each student finds one interesting fact from an online timeline or library database to share).
* **Assignments:** **Lab Reflection 1:** Write a short summary (1 page) of a significant event in computer history and its importance. *No exam or major assignment due in Week 1.*

### Week 2: Data Representation – Binary Numbers and Codes

* **Topics:** **Information representation in computers:** the binary system and why computers use binary. Conversion between number bases – **binary, decimal, and hexadecimal**. Understanding bits, bytes, and their measures (KB, MB, GB, etc.). Introduction to **ASCII and Unicode** character encoding for text.
* **Readings:** *Foundations of Information Systems*, Chapter 3 (Hardware) – **Section 3.2: Digital Devices and Binary** (covers bits/bytes and how data is represented as 0/1 signals)[[7]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=known%20as%20binary,the%20absence%20of%20an%20electronic). *Supplemental:* Instructor’s notes on number base conversion (example problems converting decimal to binary and hex, and vice versa).
* **Lab:** Practice problems converting numbers between base 10, base 2, and base 16. Students use an online simulator or worksheet to convert sample values (e.g. convert decimal 2025 to binary and hex; convert a binary byte to decimal and ASCII character). Verify answers using calculator or scripts.
* **Assignments:** **Problem Set 1 (Binary/Hex):** Complete a set of exercises doing base conversions and interpreting ASCII codes (e.g. “What binary value corresponds to the hex number C4A3?”). This is graded and due by next class. Feedback will reinforce understanding of binary data representation.

### Week 3: How Data is Stored – Images, Sound, and Other Data

* **Topics:** **Data representation beyond numbers:** how characters, images, and sound are encoded in binary. ASCII vs Unicode for text. Representing graphics (pixels, resolution, bitmaps vs vectors) and audio (sampling bits, codecs). **Units of data** (bit, byte, kilobyte, etc.) and the concept of data compression (high-level overview). This module highlights how rich media is just 0s and 1s to a computer.
* **Readings:** *Foundations of Information Systems*, Chapter 3 – review **Section 3.2** (bits and bytes) and read **Section on Data Storage** (covers how different types of data are stored; refer to any subsections on how information is encoded – e.g., text and media). *Note:* The textbook provides definitions of *binary*, *bit*, *byte*, etc., and examples of digital data measurements[[9]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Each%20one%20or%20zero%20is,process%208%20bits%20of%20data).
* **Lab:** Explore file representations: students examine file sizes and formats (e.g. a text file vs an image file) using a PC. Using a hex editor or online tool, they peek at the raw binary/hex content of a simple text file to see ASCII codes. They also use an image editing tool to reduce resolution/color depth of an image to see effect on file size.
* **Assignments:** **Lab Report 1:** Answer questions about data representation (e.g., “How many bytes are needed to store a 1000-character text document in ASCII?” or “Why do images lose quality when compressed too much?”). This write-up reinforces lecture concepts.

### Week 4: Computer Hardware – Digital Logic, Gates and Circuits

* **Topics:** **Inside the computer’s hardware:** introduction to digital logic gates (AND, OR, NOT, XOR) and how they form circuits that perform calculations. Understand the concept of a circuit and basic components like adders and decoders. The binary logic that underpins memory addressing (e.g. how a *decoder circuit* selects a memory address). Also discuss what is meant by *polling* vs interrupts at a conceptual level (as a preview of hardware communication).
* **Readings:** *Foundations of Information Systems*, Chapter 3 (Hardware) – skim the section on “Inside a Computer” (overview of CPU, memory, motherboard) to see how hardware components are organized[[10]](https://open.ocolearnok.org/informationsystems/chapter/chapter-2-computer-hardware-software-and-networks/#:~:text=Computer%20hardware%20refers%20to%20the,software%20applications%20and%20online%20resources)[[11]](https://open.ocolearnok.org/informationsystems/chapter/chapter-2-computer-hardware-software-and-networks/#:~:text=At%20a%20basic%20level%2C%20a,operations%20at%20incredibly%20high%20speeds). *Supplemental:* Instructor-provided excerpt on **logic gates and truth tables** (from an open educational source or lecture notes, since the primary text focuses more on high-level hardware).
* **Lab:** Using a simple logic simulator (or an interactive website), students build and test a few basic logic circuits – e.g., a 2-bit adder or an AND/OR logic puzzle. If no simulator, use paper exercises drawing truth tables for given gate combinations.
* **Assignments:** **Exam 1** at end of Week 4 – covers Weeks 1–3 topics (history, binary and data representation, basic logic). The exam includes base conversion problems, short answers on historical milestones, and questions like “What function does a decoder perform in a computer circuit?”. *Format:* in-class, closed-book quiz (~45 minutes).

### Week 5: Computer Architecture – CPU, Memory, and the Machine Cycle

* **Topics:** **The von Neumann architecture** – how the CPU, memory (RAM/ROM), and I/O devices interact. The **Fetch–Decode–Execute cycle**: understanding how a processor reads instructions from memory and executes them. Components of the CPU (control unit, arithmetic logic unit, registers) and their roles. Overview of primary memory vs secondary storage. Introduce the concept of machine language instructions and how addresses and data move on the system bus.
* **Readings:** *Foundations of Information Systems*, Chapter 3 (Hardware) – **Section on Computer Components** (covers CPU, primary memory, storage, input/output)[[12]](https://open.ocolearnok.org/informationsystems/chapter/chapter-2-computer-hardware-software-and-networks/#:~:text=Computer%20hardware%20refers%20to%20the,software%20applications%20and%20online%20resources)[[13]](https://open.ocolearnok.org/informationsystems/chapter/chapter-2-computer-hardware-software-and-networks/#:~:text=At%20a%20basic%20level%2C%20a,operations%20at%20incredibly%20high%20speeds). Look for discussion of how a computer processes instructions (some texts call this the machine cycle or instruction cycle). Additionally, review **Moore’s Law** from the text to appreciate CPU advancement (if included).
* **Lab:** Identify and describe real hardware: if available, a lab exercise where students inspect a computer or use system info software to list CPU type, clock speed, RAM size, hard drive vs SSD, etc. Alternatively, a virtual tour video of a PC’s interior. Students label a diagram of the computer architecture (CPU, RAM, etc.) and trace the path of an instruction through the system.
* **Assignments:** **Homework:** End-of-chapter questions from textbook Chapter 3 (e.g., define the role of the CPU, explain the difference between RAM and disk storage) to ensure understanding of hardware basics[[1]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=Foundations%20of%20Information%20Systems%20aligns,regarding%20the%20collection%2C%20processing%2C%20storage). *Due Week 6.*

### Week 6: Low-Level Programming – Machine Language and Assembly

* **Topics:** **Programming at the machine level:** how instructions are encoded in binary. Examples of simple machine language operations (op codes and operands). Introduction to **assembly language** as a human-readable form of machine code (e.g., MOV, ADD instructions). Understand the concept of an assembler translating assembly to machine code. Illustrative example: adding two numbers in machine code vs assembly[[14]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=First%20generation%20languages%20were%20called,and%204321%20using%20machine%20language)[[15]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=Assembly%20language%20is%20the%20second,and%204321%20using%20assembly%20language). Also discuss why low-level programming is hardware-specific and the difference between low-level and high-level languages.
* **Readings:** *Foundations of Information Systems*, Chapter 7 (Information Systems Development) – read the section on **Programming Languages** (generations of programming languages)[[16]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=First%20generation%20languages%20were%20called,and%204321%20using%20machine%20language)[[17]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=Third,is%20an%20example%20using%20BASIC). This section explains machine code (1st generation) and assembly (2nd generation), providing examples of each[[18]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=First%20generation%20languages%20were%20called,and%204321%20using%20machine%20language)[[19]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=Assembly%20language%20is%20the%20second,and%204321%20using%20assembly%20language). It also introduces the concept of higher-level languages in later generations.
* **Lab:** Write and run a very simple program: using an assembly-like pseudo-environment (for example, an online simulator for a basic assembly language or a predetermined set of machine instructions). Students are given a list of assembly instructions to add two numbers or perform a simple loop, and they step through execution to see how the CPU would carry them out. Alternatively, use a visual tool that shows registers changing as instructions execute.
* **Assignments:** **Lab Worksheet:** Annotate a provided snippet of assembly code (comments explaining what each instruction does). Also, answer: “Why are programs not typically written in machine code today? What advantages do high-level languages offer?” – linking to next week’s topic.

### Week 7: Problem Solving and Algorithms (Midterm Week)

* **Topics:** **Algorithm design and pseudocode:** what is an algorithm and why it is fundamental to programming. Strategies for problem solving with computers – breaking a task into step-by-step instructions. Introduction to writing **pseudocode** and/or drawing flowcharts for simple algorithms (e.g., find the largest of three numbers, or simple sorting concept). Emphasis on developing logical thinking and *critical thinking skills* by defining problems in a clear series of steps[[20]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=Or).
* **Readings:** *Foundations of Information Systems*, Chapter 7 – the **introduction section on Systems Development** and **Programming** (covers the idea of creating software to solve problems, though not in-depth pseudocode). Focus on the description of the **software development process** and the role of algorithms in programming (the text outlines general programming concepts and may mention pseudocode or flowcharts in context). Also refer to Chapter 7’s coverage of **software development methodologies** for insight into structured problem solving.
* **Lab:** Hands-on practice with algorithms: students work in small groups to outline a solution for a given problem in pseudocode (for example, an algorithm to calculate a student’s average grade, or to search for a name in a list). They then trade pseudocode with another group to trace it with sample inputs (“dry run” the algorithm) and check correctness.
* **Assignments:** **Midterm Exam** (Week 7) – a comprehensive test covering Weeks 1–6 material: history, data representation (including conversions), hardware components, and low-level programming concepts. The midterm includes short essays (e.g., describe how an operating system differs from hardware – even if OS is covered next week, students can answer from prior knowledge), binary problems, and conceptual questions (e.g., “What is an algorithm?” as a definition). *Scheduled mid-week.* After the exam, any remaining class time is used to introduce the team project and form teams. Teams should decide on a project topic by next week.

### Week 8: Modular Programming – Data Types, Abstract Data Types, and Subprograms

* **Topics:** **From algorithms to programs:** introduction to data types (integers, floats, strings, etc.) and why we need different types. The concept of an **abstract data type (ADT)** – e.g., thinking of a list or stack in terms of operations rather than implementation. Importance of breaking programs into **subroutines (functions)** for modularity and reuse. Parameters and return values (conceptually). This builds on pseudocode by organizing it into logical chunks. (Note: This week is a conceptual bridge to high-level programming – no actual coding in a specific language, but using pseudocode with functions.)
* **Readings:** *Foundations of Information Systems*, Chapter 7 – continue with **Programming Concepts** section, focusing on how software is structured. Look for any discussion of *modularity* or *functions* in the development process (the text may discuss software development life cycle, which can be tied to designing modular solutions). If the primary text lacks detail, a brief **supplemental reading** will be provided on basic programming structures (variables, data types, and functions) – drawn from an open-source programming textbook.
* **Lab:** Pseudocode to code (conceptual): Given a simple task (e.g., converting temperatures between Celsius and Fahrenheit), students outline an algorithm, then segment it into sub-tasks (input, conversion calculation, output). The lab asks them to write a pseudocode function convertTemp(x) and demonstrate using it in a main algorithm. If time permits, demonstrate how this pseudocode might look in a real language like Python or Java (just for illustration).
* **Assignments:** **Project Proposal Due:** Each project team submits a one-paragraph proposal of their chosen research topic (with a few bullet points on what they plan to cover and one preliminary reference). Instructor will approve or give feedback. No separate exam/quiz this week; focus is on project planning and continuing algorithm practice.

### Week 9: High-Level Languages and Object-Oriented Design

* **Topics:** **High-level programming languages:** characteristics of third-generation languages (e.g., Python, Java) and how they are translated (compilers vs interpreters). Benefits of high-level languages over low-level. Overview of programming paradigms with emphasis on **Object-Oriented Programming (OOP)**: concepts of classes, objects, inheritance, and encapsulation at a basic level. Example: illustrate a real-world analogy (like class Animal with subclasses Dog, Cat). Also discuss **algorithm vs program:** turning an algorithm into actual code in a high-level language.
* **Readings:** *Foundations of Information Systems*, Chapter 7 – **Generations of Programming Languages** (review the latter part of this section) which covers 3GLs and 4GLs and why they exist[[21]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=Third,is%20an%20example%20using%20BASIC)[[22]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=Fourth%20generation%20languages%20are%20a,Clipper%2C%20FOCUS%2C%20SQL%2C%20and%20SPSS). The text’s example of BASIC vs assembly provides context[[23]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=they%20run%20and%20are%20similar,is%20an%20example%20using%20BASIC). Also read any part of Chapter 7 that mentions **object-oriented or modern development practices**. *Supplemental:* A short excerpt from an open-source CS textbook explaining the core ideas of object-oriented design (since our main text is business-focused, a one-page summary of OOP concepts will be provided).
* **Lab:** **Interactive coding demo:** The instructor demonstrates a simple class definition in an OOP language (such as a Student class with attributes and methods) using an online IDE or pseudocode. Students do not need to write full code, but they will work in pairs to sketch a class diagram for a familiar concept (e.g., a class Book with attributes title/author and a method borrow() for a library system). They then discuss how this abstraction helps manage complexity.
* **Assignments:** **Quiz:** Brief in-class quiz or homework on programming concepts: e.g., identify which generation a given language belongs to, or explain in a few sentences the difference between a compiler and an interpreter, and define one OOP term (like “What is a class in object-oriented programming?”). This solidifies the vocabulary of programming for non-programmers.

### Week 10: Operating Systems and Software Platforms

* **Topics:** **The Operating System (OS) layer:** functions of an OS – managing hardware resources (CPU scheduling, memory management), providing a user interface, handling file management, and facilitating multitasking. Examples of popular operating systems (Windows, macOS, Linux, Android) and discussion of **graphical user interface vs command-line interface**[[24]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=Course%20Grading%20Formula%3A). Introduction to the concept of processes and threads, and how the OS allocates memory (virtual memory basics). Also cover the **software stack**: system software vs application software, and how they interact.
* **Readings:** *Foundations of Information Systems*, Chapter 4 (Software) – **Section on Operating Systems** (explains roles of the OS, examples of OS, and user interfaces)[[25]](https://open.ocolearnok.org/informationsystems/chapter/chapter-2-computer-hardware-software-and-networks/#:~:text=,the%20internet%2C%20intranet%2C%20and%20extranet)[[26]](https://open.ocolearnok.org/informationsystems/chapter/chapter-2-computer-hardware-software-and-networks/#:~:text=tasks%20and%20run%20programs,software%20applications%20and%20online%20resources). Also Chapter 4’s coverage of software categories (system vs application software) to clarify the OS’s place in the software hierarchy. If available, read the text’s discussion of **UI types** (GUI vs CLI)[[24]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=Course%20Grading%20Formula%3A).
* **Lab:** **Operating System Exploration:** If in a computer lab, students perform tasks on the OS: e.g., open the Task Manager (or Activity Monitor) to observe running processes and CPU/memory usage; use the file explorer to navigate directories and then compare with a simple command-line operation (like listing files in a folder). They also practice basic file management: create, rename, organize folders, and observe file paths.
* **Assignments:** **Writing Assignment – Tech in Society:** Draft of the individual ethics essay is assigned this week. Topic example: *“Computer Ethics and Security”* – students will discuss an issue such as data privacy, social networking pros and cons, or the digital divide. They must take a position and support it with research. **Draft due Week 12.** (This fulfills part of the writing intensive component.)

### Week 11: File Systems and Data Storage Management

* **Topics:** **File systems and directories:** how operating systems organize data on storage media. Concepts of files, folders (directories), and file paths. Differences between common file systems (e.g., NTFS, FAT32, ext4) at a high level. **File operations:** opening, reading, writing, and the idea of file permissions. Sequential vs direct (random) file access – understanding how data can be read in order vs accessed by index[[27]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=Test%20,15). Also cover disk scheduling basics (how an OS might optimize reading from disk) and introduce **secondary storage** concepts (hard drives vs SSD, how data is physically stored in blocks).
* **Readings:** *Foundations of Information Systems*, Chapter 4 (Software) – check for any subsection on **File Management** (some texts include this in the OS chapter). Additionally, Chapter 5 (if applicable) might discuss data storage in context of databases, but here we focus on OS-level files. If the main text lacks detail, use a *supplemental resource:* an online open tutorial on file systems. Focus on understanding directory structures and path notation (C:\Users\… vs /home/… in Linux).
* **Lab:** **Hands-on File Management:** Students complete a step-by-step exercise: create a nested set of folders, save and organize files, then practice locating them via search. They also experiment with file permissions (if on a system that allows it, e.g., check properties of a file). If resources allow, demonstrate using a simple command-line command (like mkdir, cd, ls/dir) to do some of these operations to contrast with GUI.
* **Assignments:** **Exam 2** (Week 11 or 12): A second mid-term exam covering Weeks 8–11 material (programming concepts through file systems). This exam tests understanding of software layers. For example, it may ask: “What is the difference between sequential and direct file access?” with an example[[28]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=Midterm%20Exam%20%20%20,20), or have students label parts of a file path. *Tentative Date:* The exam will be held in the first class of Week 12 to avoid overload, as described below. Students should also be finalizing their individual essay drafts and working with their project teams.

### Week 12: Databases and Information Systems in Action

* **Topics:** **Database Management Systems (DBMS):** what is a database and why we use one. Introduction to the relational database model – concepts of tables, records (rows), fields (columns), and primary keys. Simple SQL queries (SELECT statements) to retrieve data. Discuss how databases underpin many information systems. **Information systems** in organizations: briefly survey how businesses use databases in applications (e.g., inventory systems, student registration system) and the importance of data management. This week ties the low-level data storage to high-level use of data for decision-making.
* **Readings:** *Foundations of Information Systems*, Chapter 4 (Software) – if it includes a **section on Data and Databases**, read that (or Chapter 4 in *Information Systems for Business and Beyond* which specifically covers Data and Databases)[[29]](https://resources.saylor.org/wwwresources/archived/site/textbooks/Information%20Systems%20for%20Business%20and%20Beyond.pdf#:~:text=In%20this%20chapter%2C%20we%20discuss,chapter%20explores%20how%20organizations%20use)[[30]](https://open.umn.edu/opentextbooks/textbooks/information-systems-for-business-and-beyond#:~:text=Chapter%201%3A%20What%20Is%20an,5%3A%20Networking%20and%20Communication). Key points: understanding what a DBMS is and examples (MySQL, Oracle, etc.). Also, skim Chapter 8 (Security) introduction to foresee why databases require security.  
  *Note:* The chosen text emphasizes practical business use of databases[[31]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=This%C2%A0asynchronous%206,systems%20hardware%20and%20software%20components). Ensure to glean the basic definitions of databases, and look at any end-of-chapter exercises about creating or querying a sample table.
* **Lab:** **Intro to SQL and Access:** In the lab, students use Microsoft Access (or an open-source equivalent like LibreOffice Base) to create a very simple database table (for example, a table of books with Title, Author, Year). They enter a few records manually, set a primary key, and run a simple query (e.g., “find all books after 2015”). This hands-on practice solidifies the concept of structured data.
* **Assignments:**
* **Exam 2** – administered this week (first session) covering OS (Week 10) and File Systems (Week 11) primarily, and some programming/OOP review. After the exam, proceed with the database topics as above.
* **Ethics Essay Due** – Students submit their individual writing assignment (e.g., *Pros and Cons of Social Networking* or another approved topic related to technology ethics). This should be a polished 3–4 page paper demonstrating their ability to research and articulate an argument about a computing issue, with MLA citations.
* **Team Project Progress Check:** Teams should have an outline of their final project report and at least **3 sources** gathered by end of this week. (They will receive feedback to prepare for presentations next week.)

### Week 13: Networking Fundamentals and Cybersecurity

* **Topics:** **Computer Networks:** why networking is essential; network terminologies – **LAN, WAN, client/server**. Common network topologies (bus, star, mesh) and their uses[[32]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=Or). The **Internet model (TCP/IP):** basic idea of how data is packetized and routed; explain what an IP address is and the concept of packet switching (trace a packet’s journey from one computer to another). Also discuss the World Wide Web vs the Internet, and protocols like HTTP.  
  **Network Security:** Major threats (malware, phishing) and basic security measures (firewalls, encryption). The **CIA triad** – confidentiality, integrity, availability – as goals of information security[[33]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%208%3A%20Security%208,The%20Information%20Security%20Triad%20178). Mention real-world issues: recent data breaches, importance of strong passwords, two-factor authentication. This topic encourages ethical thinking about how to protect information.
* **Readings:** *Foundations of Information Systems*, Chapter 6 (Networks) – read this entire chapter for a comprehensive overview of networking concepts[[34]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=108%205,Organizational)[[35]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%206%3A%20Networks%20Chapter%206,examines%20programming%2C%20and%20the%20different). It covers the history of the Internet, how networks operate, and includes a section following a data packet through the Internet[[34]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=108%205,Organizational). Then read *Foundations*, Chapter 8 (Security) – **Section 8.1–8.3** on cybercrime and the security triad[[33]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%208%3A%20Security%208,The%20Information%20Security%20Triad%20178). These sections define key security concepts and threats.
* **Lab:** **Networking Lab:** Demonstration of network tools – e.g., use the ping command or an online traceroute tool to see how many hops to reach a website. Show how to find your computer’s IP address. If possible, demonstrate a simple network simulation (using software or a website) to visualize packet routing. For security, demonstrate encryption with a simple tool (e.g., show how a message looks when encrypted vs plaintext). Alternatively, a group exercise: have students role-play as “sender” and “receiver” passing secret messages with a “hacker” in between to illustrate encryption (using a paper cipher).
* **Assignments:** **Homework:** End-of-chapter review questions from Chapter 6 *Networks* (e.g., list and define 3 types of network topology; explain what TCP/IP is) and Chapter 8 *Security* (e.g., define malware, what are the three goals in the security triad?)[[33]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%208%3A%20Security%208,The%20Information%20Security%20Triad%20178). This ensures they grasp networking basics. *Due next class.* Teams finalize their project presentations. Instructor will schedule presentation order for Week 14.

### Week 14: Computing in Society, Ethics, and Final Project Presentations

* **Topics:** **Computer Ethics and Social Implications:** Review and discussion of ethical issues in computing. Topics include intellectual property (software licensing, piracy), privacy and surveillance, impacts of social media, digital divide, and professionalism in IT. Students reflect on ethical scenarios (e.g., data privacy policies, appropriate use of technology at work). This ties back to their essay topics, allowing a class discussion on what they learned in their research. Also touch on **emerging technologies** (AI, machine learning, IoT) and their potential societal impact – as many final projects may cover these. A brief wrap-up connecting all course topics to the idea of being an informed “computer technologist” in society.
* **Readings:** *Foundations of Information Systems*, Chapter 9 (Impacts of Information Systems) – **Sections 9.2–9.3** on ethics and intellectual property[[36]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%209%3A%20Impacts%20of%20Information,Intellectual%20Property%20and%20Copyright%20204). This reading provides insight into legal and ethical issues such as privacy and copyright in the information age. (Students will recognize some themes from their writing assignment research.) If any group’s project is on an advanced topic (like AI), students might also be directed to a relevant subsection of the text or a current article for class discussion.
* **Lab:** **Team Project Presentations:** Each team delivers their **oral presentation** (~10–15 minutes per team) on their chosen topic, using slides. This is conducted as a formal mini-conference: teams present findings and demos (if any) while classmates and instructor ask questions. All team members must speak. The class gives peer feedback. (If needed, some presentations may continue into Week 15 if time is short.)
* **Assignments:** **Final Project Report:** Teams submit the written report for their project by the end of this week. This report (one per team) should compile their research, analysis, and conclusions on the topic, properly citing sources. The report and presentation are graded on content, clarity, use of technology (e.g., inclusion of an Excel chart or small database example, as required[[37]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=intelligence%2C%20security%2C%20and%20gaming,The%20final)), and collaboration. *There is no new homework assigned this week* – students should focus on reviewing for the final exam and reflecting on feedback from presentations.

### Week 15: Course Review and Final Exam

* **Topics:** **Course Review:** Brief review of key concepts from the semester, addressing any final questions. Emphasis on tying together topics – for example, how data flows from hardware (binary circuits) all the way to high-level applications and networks. Students are encouraged to share one “big takeaway” from the course.
* **Final Exam:** A comprehensive **Final Exam** is administered. It covers all course topics, with extra emphasis on the latter third (operating systems, file systems, databases, networking, and ethics). The format includes: binary/hex conversion problems, short-answer questions (e.g., explain a concept like cloud computing or the role of an OS), and scenario-based questions (e.g., given a situation, identify security risks or ethical issues). Some questions will integrate knowledge from multiple areas (for instance, an example scenario of a company’s IT system might prompt questions on hardware, software, networks, and databases).
* **Lab:** (If time remains after the exam) Course wrap-up and evaluations. Students complete any required course evaluation. The instructor highlights resources for further learning in computer science and information technology, encouraging students to continue exploring (and possibly introduces the next course in sequence, CST1101).
* **Assignments:** **None beyond the Final Exam.** All coursework is now complete. Congratulations to the students for completing Introduction to Computer Systems!

**Note:** All readings are from openly-licensed materials, and chapter numbers correspond to the OER textbooks listed. The schedule above ensures that the **full range of course topics** is covered using the selected open textbook(s)[[1]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=Foundations%20of%20Information%20Systems%20aligns,regarding%20the%20collection%2C%20processing%2C%20storage)[[3]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=Workplace%20Software%20and%20Skills%20is,skills%20needed%20for%20today%E2%80%99s%20workforce). End-of-chapter exercises and lab activities provide students with practice and self-assessment opportunities[[2]](https://open.umn.edu/opentextbooks/textbooks/information-systems-for-business-and-beyond#:~:text=The%20end%20of%20chapter%20summaries,key%20points%20of%20the%20chapter), and the integrated writing assignments and project meet the course’s writing intensive and teamwork objectives. This redesigned syllabus maintains the structure and learning outcomes of the original CST1100 course while leveraging high-quality free resources for student success.

**Sources:**  
- OpenStax, *Foundations of Information Systems* (2025) – CC BY textbook covering hardware, software, data, networks, ethics[[1]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=Foundations%20of%20Information%20Systems%20aligns,regarding%20the%20collection%2C%20processing%2C%20storage)[[36]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%209%3A%20Impacts%20of%20Information,Intellectual%20Property%20and%20Copyright%20204).  
- OpenStax, *Workplace Software and Skills* (2023) – CC BY textbook for Office applications (Word, Excel, Access, PowerPoint) with practical exercises[[3]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=Workplace%20Software%20and%20Skills%20is,skills%20needed%20for%20today%E2%80%99s%20workforce).  
- Bourgeois, *Information Systems for Business and Beyond* – CC BY, 2019/2020 (reference for programming concepts; includes end-of-chapter quizzes)[[2]](https://open.umn.edu/opentextbooks/textbooks/information-systems-for-business-and-beyond#:~:text=The%20end%20of%20chapter%20summaries,key%20points%20of%20the%20chapter)[[16]](https://ecampusontario.pressbooks.pub/informationsystemscdn/chapter/7-8-programming/#:~:text=First%20generation%20languages%20were%20called,and%204321%20using%20machine%20language).  
- City Tech CST1100 Original Syllabus (Spring 2022) – for course objectives and outcome alignment[[38]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=Or)[[39]](file://file-DnXSUufoo3o943Jcfgp7i2#:~:text=skills%20needed%20for%20an%20increasingly,facilitate%20the%20student%20becoming%20a).

[[1]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/" \l ":~:text=Foundations%20of%20Information%20Systems%20aligns,regarding%20the%20collection%2C%20processing%2C%20storage) [[3]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=Workplace%20Software%20and%20Skills%20is,skills%20needed%20for%20today%E2%80%99s%20workforce) [[4]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=covering%20computer%20literacy%2C%20Microsoft%20Office%2C,skills%20needed%20for%20today%E2%80%99s%20workforce) [[31]](https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/#:~:text=This%C2%A0asynchronous%206,systems%20hardware%20and%20software%20components) Open Educational Resources and Information Technology and Information Systems - ASCCC Open Educational Resources Initiative

<https://asccc-oeri.org/open-educational-resources-and-information-technology-and-information-systems-itis/>

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<https://open.umn.edu/opentextbooks/textbooks/information-systems-for-business-and-beyond>

[[5]](https://openstax.org/books/foundations-information-systems/pages/1-1-introduction-to-information-systems#:~:text=,and%20operations%20of%20information%20systems) [[6]](https://openstax.org/books/foundations-information-systems/pages/1-1-introduction-to-information-systems#:~:text=It%E2%80%99s%20helpful%20to%20understand%20the,to%20process%20and%20manage%20information) 1.1 Introduction to Information Systems - Foundations of Information Systems | OpenStax

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[[7]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=known%20as%20binary,the%20absence%20of%20an%20electronic) [[9]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Each%20one%20or%20zero%20is,process%208%20bits%20of%20data) [[33]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%208%3A%20Security%208,The%20Information%20Security%20Triad%20178) [[34]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=108%205,Organizational) [[35]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%206%3A%20Networks%20Chapter%206,examines%20programming%2C%20and%20the%20different) [[36]](https://openlibrary-repo.ecampusontario.ca/jspui/bitstream/123456789/1086/7/Information-Systems-for-Business-and-Beyond-1682004062.pdf#:~:text=Chapter%209%3A%20Impacts%20of%20Information,Intellectual%20Property%20and%20Copyright%20204) Information Systems for Business and Beyond

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