# CST1100 – Introduction to Computer Systems

**Credits/Hours:** 3 credits; 4 hours/week (2 lecture, 2 lab)

**Instructor:**   
**Term:** Fall 2025  
**Location:** City Tech

## Course Description

This course surveys machine architecture, software development, data organization, ethics, and computer security. It also introduces algorithms and the historical development of computing. We pair every topic with a hands‑on lab using **Python in Google Colab** and short SQL exercises using **PostgreSQL/Supabase**.

## Learning Outcomes

* Convert between decimal, binary, and hexadecimal; explain bits/bytes and character encodings.
* Describe and simulate basic logic gates and the fetch–execute cycle.
* Explain OS roles; perform file I/O and simple process inspection.
* Design algorithms and implement them in Python; read/write data from files and databases.
* Explain networks, packet switching, and basic security concepts.
* Use SQL (PostgreSQL) to create tables and query data; deploy a simple Supabase project.
* Communicate ethically and effectively in written and oral forms; work in teams.

## Required Materials

* Primary text: *Computer Science Illuminated* (latest edition).
* Google account (for Colab), GitHub account, and free Supabase project.
* Laptop with browser; stable internet; optional flash drive for backup.

## Grading

| Category | Weight |
| --- | --- |
| Midterm Exam | 20% |
| Final Exam | 25% |
| Labs & Assignments (Python/SQL) | 20% |
| Participation (in‑class Q&A + writing) | 15% |
| Team Project (technical demo + README + presentation) | 20% |

*Late policy:* Partial credit at instructor discretion. Academic integrity policies apply.

## Course Policies (Short)

* **Attendance & participation:** Required; missed in‑class work affects the grade.
* **Collaboration:** Discuss ideas freely; submit your own code unless a team deliverable is specified.
* **AI tools:** Allowed for brainstorming and documentation when cited; you are responsible for correctness.

## Weekly Schedule (Topics, Labs, and Readings)

| Wk | Topics & Activities | Readings & Tools |
| --- | --- | --- |
| 1 | **Orientation + The Big Picture.** Course setup; intro to Colab, GitHub, Supabase. | CS Illuminated Ch. 1; Colab intro; Git basics. |
| 2 | **Binary & Number Systems.** Conversions; ASCII/Unicode. *Lab:* Python converters. | Ch. 2; Colab notebook. |
| 3 | **Data Representation.** Bits/bytes; images & text. *Lab:* Inspect bytes with Python; SQL SELECT. | Ch. 3; Postgres basics. |
| 4 | **Hardware & Logic Gates.** Truth tables; circuits. *Lab:* Build gates & adders in Python. | Ch. 4. |
| 5 | **CPU & Memory.** Fetch–execute; RAM vs ROM. *Lab:* Simple CPU simulator in Python. | Ch. 5. |
| 6 | **Low‑level Programming.** Machine code & assembly. *Lab:* Encode/decode; SQL DML. | Ch. 6. |
| 7 | **Midterm Exam** + **Algorithm Design workshop.** Pseudocode → Python. | Ch. 7. |
| 8 | **ADTs & Functions.** Lists/stacks; Python functions. *Lab:* Supabase schema design. | Ch. 8. |
| 9 | **OOP & APIs.** Classes; HTTP basics. *Lab:* Mini API client in Python. | Ch. 9. |
| 10 | **Operating Systems.** Processes, memory, scheduling. *Lab:* OS introspection via Python. | Ch. 10. |
| 11 | **File Systems.** Paths, directories, disk scheduling. *Lab:* Python file I/O; Postgres indexes & EXPLAIN. | Ch. 11. |
| 12 | **Applications & Databases.** Information systems; AI overview. *Lab:* Supabase joins & security basics. | Ch. 12–13. |
| 13 | **Networks & Security.** Topologies; packet switching; crypto intro. *Lab:* Python sockets & HTTPS. | Ch. 15, 17. |
| 14 | **Team Project Demos.** In-class presentations + peer feedback. | – |
| 15 | **Final Exam + Wrap‑up.** | – |

## Team Project

Teams (3–4) build a small computing system using Python + SQL that showcases course concepts. Deliverables: GitHub repo, README, 6–8 slide deck, and a 5–7 minute demo.

## OER / Links (posted on the course site)

* Python/Colab starter notebooks and logic‑gate templates.
* PostgreSQL + Supabase quickstart guides; mini datasets.
* Networking sandbox materials and security primers.

## Academic Integrity & Conduct

Follow college academic integrity policies. Cite sources (including AI tools) and collaborate responsibly.

This syllabus may be updated during the term; changes will be announced in class.