

Fundamentals of Computer Science (FCPS) CTY Course Syllabus

Brief Schedule

Week 1

- Introduction and definition
- Logic and Gates
- Hardware Systems
- Binary number and math
- Machine/Assembly Language

Week 2

- Operating Systems
- Algorithms
- Programming Languages
- Theory of Computation
- Computer Applications
- Software Development

Week 3

- Networks
- Advanced Programming Structures
- Computer Graphics
- Digital Media
- Computer Animation
- Computer Gaming
- Artificial Intelligence
- Programming Project
- Closing session/assessment

Detailed Schedule

Day	Session	Topics and Activities
Day 1 Monday	morning	<ul style="list-style-type: none"> • CTY Honor Code • Computer Etiquette and Professionalism • Get to know teaching staff and classmates • Pre-assessment • Introduction to computers (storing your files on the server, shortcuts, etc.)
	afternoon	<ul style="list-style-type: none"> • Know and recognize computer • Identify applications of computers • Identify components of computers/systems • Have a working definition of computer science • Work on predictions of how computer science may shape their future
	evening	<ul style="list-style-type: none"> • Identify components of various computer systems
Day 2 Tuesday	morning	<ul style="list-style-type: none"> • Logic and Gates • States of 0's and 1's (False and True) • Gate Simulation • Logic Operations
	afternoon	<ul style="list-style-type: none"> • Real Life Application – Logic and Gates • Complex Gates (XOR & NOR)
	evening	<ul style="list-style-type: none"> • Create Logic Gate Circuits
Day 3 Wednesday	morning	<ul style="list-style-type: none"> • Hardware Systems • Processors – CPU & GPU • Address Calls • Memory Allocations • Units and Speeds
	afternoon	<ul style="list-style-type: none"> • I/O Devices • Expansion Slots • All-In-One Systems
	evening	<ul style="list-style-type: none"> • Hardware Activity – Build a System

Day	Session	Topics and Activities
Day 4 Thursday	morning	<ul style="list-style-type: none"> • Binary Numbers and Math • Binary Conversion • Binary Addition and Subtraction
	afternoon	<ul style="list-style-type: none"> • 2's Complement • Other math functions • Binary Games
	evening	<ul style="list-style-type: none"> • Programming - Python
Day 5 Friday	morning	<ul style="list-style-type: none"> • Machine/Assembly Language • MIPS • Computer Architecture
	afternoon	<ul style="list-style-type: none"> • Instruction Processing • Compilers • Create MIPS program
Sunday	evening	<ul style="list-style-type: none"> • Battle – PC vs. Mac
Day 6 Monday	morning	<ul style="list-style-type: none"> • Operating Systems • Files and Folders • Packaged Software • PC, Mac, Unix/Linux • Utilities and System Management • System protection • Activity – Design an OS
	afternoon	<ul style="list-style-type: none"> • Algorithms • Different Types and their uses • Problem Solving
	evening	<ul style="list-style-type: none"> • Algorithms Activity
Day 7 Tuesday	morning	<ul style="list-style-type: none"> • Programming Languages • Definition and Attributes • Functions
	afternoon	<ul style="list-style-type: none"> • Focus on Python • Language structure
	evening	<ul style="list-style-type: none"> • Program Project

Day	Session	Topics and Activities
Day 8 Wednesday	morning	<ul style="list-style-type: none"> • Programming Languages (continued) • Programming guides
	afternoon	<ul style="list-style-type: none"> • HTML and Internet • Hyperlinks
	evening	<ul style="list-style-type: none"> • Webpage Project
Day 9 Thursday	morning	<ul style="list-style-type: none"> • Theory of Computation • Different Models • Time vs. Space • Big O
	afternoon	<ul style="list-style-type: none"> • Computer Application • Documents • Spreadsheets • Databases • Presentations • Shortcuts and Tricks
	evening	<ul style="list-style-type: none"> • Build a Database or Presentation
Day 10 Friday	morning	<ul style="list-style-type: none"> • Software Development • Development Cycle • Duties and Functions • Layers and Platforms
	afternoon	<ul style="list-style-type: none"> • Development Simulation
Sunday	evening	<ul style="list-style-type: none"> • Web Quest Investigation
Day 11 Monday	morning	<ul style="list-style-type: none"> • Networks • WAN • LAN • Hardware Devices • Pick Speed vs. Cost • Bandwidth • Making a Connection • Security • Wireless • Network Activity

Day	Session	Topics and Activities
	afternoon	<ul style="list-style-type: none"> • Digital Media • Imaging • Design • Interactive
	evening	<ul style="list-style-type: none"> • Computer Art Project
Day 12 Tuesday	morning	<ul style="list-style-type: none"> • Computer Graphics • Hardware – Requirements and Performance • Software – Design • Light Effects
	afternoon	<ul style="list-style-type: none"> • Advanced Programming Structures • Focus on Python • Recursion
	evening	<ul style="list-style-type: none"> • Programming Project
Day 13 Wednesday	morning	<ul style="list-style-type: none"> • Complete Python programming assignment. • Sample OpenGL with codes and programs
	afternoon	<ul style="list-style-type: none"> • Computer Gaming • OpenGL and PyGame programming types
	evening	<ul style="list-style-type: none"> • Build One Activity • Computer Graphics • Python program
Day 14 Thursday	morning	<ul style="list-style-type: none"> • Artificial Intelligence • Elements of • Agents • A* • Applied Application
	afternoon	<ul style="list-style-type: none"> • Student evaluation of course • Demo of Projects
	evening	<ul style="list-style-type: none"> • No Class
Day 15 Friday	morning	<ul style="list-style-type: none"> • Course Highlights and Review • Careers • The Future