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	• 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	• 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	• Identify components of various computer systems
Day 2 Tuesday	morning	• Logic and Gates • States of 0's and 1's (False and True) • Gate Simulation • Logic Operations
	afternoon	• Real Life Application – Logic and Gates • Complex Gates (XOR & NOR)
	evening	• Create Logic Gate Circuits
Day 3 Wednesday	morning	• Hardware Systems • Processors – CPU & GPU • Address Calls • Memory Allocations • Units and Speeds
	afternoon	• I/O Devices • Expansion Slots • All-In-One Systems
	evening	• Hardware Activity – Build a System

Day	Session	Topics and Activities
Day 4 **Thursday**	morning	• Binary Numbers and Math • Binary Conversion • Binary Addition and Subtraction
	afternoon	• 2's Complement • Other math functions • Binary Games
	evening	• Programming - Python
Day 5 **Friday**	morning	• Machine/Assembly Language • MIPS • Computer Architecture
	afternoon	• Instruction Processing • Compilers • Create MIPS program
Sunday	evening	• Battle – PC vs. Mac
Day 6 **Monday**	morning	• Operating Systems • Files and Folders • Packaged Software • PC, Mac, Unix/Linux • Utilities and System Management • System protection • Activity – Design an OS
	afternoon	• Algorithms • Different Types and their uses • Problem Solving
	evening	• Algorithms Activity
Day 7 **Tuesday**	morning	• Programming Languages • Definition and Attributes • Functions
	afternoon	• Focus on Python • Language structure
	evening	• Program Project

Day	Session	Topics and Activities
Day 8 Wednesday	morning	• Programming Languages (continued) • Programming guides
	afternoon	• HTML and Internet • Hyperlinks
	evening	• Webpage Project
Day 9 Thursday	morning	• Theory of Computation • Different Models • Time vs. Space • Big O
	afternoon	• Computer Application • Documents • Spreadsheets • Databases • Presentations • Shortcuts and Tricks
	evening	• Build a Database or Presentation
Day 10 Friday	morning	• Software Development • Development Cycle • Duties and Functions • Layers and Platforms
	afternoon	• Development Simulation
Sunday	evening	• Web Quest Investigation
Day 11 Monday	morning	• Networks • WAN • LAN • Hardware Devices • Pick Speed vs. Cost • Bandwidth • Making a Connection • Security • Wireless • Network Activity

Day	Session	Topics and Activities
	afternoon	• Digital Media • Imaging • Design • Interactive
	evening	• Computer Art Project
Day 12 **Tuesday**	morning	• Computer Graphics • Hardware – Requirements and Performance • Software – Design • Light Effects
	afternoon	• Advanced Programming Structures • Focus on Python • Recursion
	evening	• Programming Project
Day 13 **Wednesday**	morning	• Complete Python programming assignment. • Sample OpenGL with codes and programs
	afternoon	• Computer Gaming • OpenGL and PyGame programming types
	evening	• Build One Activity • Computer Graphics • Python program
Day 14 **Thursday**	morning	• Artificial Intelligence • Elements of • Agents • A* • Applied Application
	afternoon	• Student evaluation of course • Demo of Projects
	evening	• No Class
Day 15 **Friday**	morning	• Course Highlights and Review • Careers • The Future