

Gray Matter Fall 2018 - Course Catalog

Online

Online Computer Programming

Teacher: Collin Eye

Grades: 6, 7, 8, 9, 10, 11, 12

Class Schedule: self-paced

Class Time: self-paced

Duration: self-paced, 32 weeks

Fee(s):

Full Tuition

Supply Fee

\$702.00

\$0

Description:

This course is one-on-one, online instruction in computer programming, catered to the experience level of each student. Whether you're completely new to programming, have experience with programming in languages other than C, or want to continue your programming education, this is the class for you. Programming is an art form, and like any art form, mastery requires self-discipline, practice, and a bit of guidance.

You'll have access to videos on a variety of topics such as basic computer architecture, the C programming language, cryptography, systems programming in various operating systems, physics simulation, 2D game design, and many more. Each video is accompanied by exercises which will help you reinforce the topics with hands on experience. Students are able to explore the videos matching their skill-level and interests at their own pace.

New students will learn:

- The C programming language
- The logic implemented in circuits and how we use it to move and transform data.
- Data structures, how we organize and think about data in the computer's memory.
- How to think about problems mathematically, and represent processes in an algorithmic way.

New students will learn how to implement projects such as:

- Simple games such as tic-tac-toe, rock-paper-scissors, connect4
- Random number generators
- Text adventures
- Image and music generators
- RNA-DNA translation and transcription
- Conway's Game of Life

Advanced students will learn:

- Project architecture
- The math used to make graphics and simulate worlds
- Advanced data structures such as trees, graphs, and hash tables.
- How to develop cross-platform code-bases
- Computer networking
- Multithreading for faster computations
- A variety of topics from computer science like cryptography, language-theory, complexity theory, artificial intelligence

Advanced students will take these topics and develop their own projects which put them to use. They will also see how the following can be implemented:

- Ray tracing 3D-graphics
- Equation solvers and function plotters
- Cross-platform game engines
- Sentence parsers and generators

Students will be able to email me with questions anytime, schedule video-conferencing, or request videos on particular subjects they're interested in. I encourage everyone to develop their own projects, and seek advice on how to achieve their goals. This allows you to always reach a little beyond your current ability, and learn how an experienced programmer confronts new challenges.

Prerequisites:

None

Homework:

Students can expect to spend 1-3 hours per week.

Class Materials:

Every student is expected to have a dedicated computer on which they can program. I recommend the Raspberry Pi 3, as they're much cheaper than other computers, and are easy to experiment with. In addition to the computer they'll also need a monitor, keyboard, and mouse.

Payment Options:

1. Full tuition of \$702.00 due at time of registration.
2. Semester tuition of \$351 due at time of registration and second semester payment of \$351 due by January 15th
3. Monthly payments of \$78. First month is due at time of registration. Subsequent monthly payments of \$78 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.