THE GOVERNOR'S SCHOOL for SCIENCE AND TECHNOLOGY

COMPUTATION SCIENCE: ENGINEERING DESIGN, INNOVATION & ENTREPRENEURSHIP

Fall 2022 - Spring 2023

M, T, W, Th – 90 mins

Course Description:

The course begins with a broad introduction to computer science, along with a basic coding structure in C++. Further into the course, we apply programming knowledge and skills to solve real-life problems. The course will also be partnering with the engineering strand in the EDIE lab to work on EDIE lab projects.

Instructor: Elena Kuchina

Email: elena.kuchina@nhrec.org

Student Email Policy:

Students are encouraged to communicate with their instructors via Canvas. When communicating outside of Canvas by email, students must use their GSST (NHREC) email account when contacting their instructor or interacting with classmates. Students are responsible for checking their Canvas inbox and their GSST e-mail account regularly.

Instructor Email Response Policy:

Students are also encouraged to email the instructor with questions about their projects. Email is answered within 24 hours during the week and within 48 hours on the weekend.

Methods of Instruction:

Come to class on time with a programming laptop for coursework. If you do not have one, it is not compatible, or cannot be used for the course's purposes, one will be provided to you. We start with a lecture and assign classwork that is due by the end of tomorrow's class or by the end of Monday's class if on a Thursday. After completing a chapter, there will be a quiz. There will also be test(s) each quarter. Fridays will focus primarily on the EDIE labs.

Course Purposes and Objectives:

Fall Semester

- Implement value-returning and void functions using value and reference parameters.
- Implement structured data types using C++ struct
- Use header files for structured data type definitions
- Implement multi-dimensional arrays containing simple and structured data types.
- Suggest technological design solutions, including cost, risk, benefits, potential environmental impacts and other trade-offs.

Spring Semester

- Demonstrate ability to design and implement computer-based solutions to problems in a variety of application areas.
- Demonstrate the ability to read and understand a large program consisting of several classes and interacting objects and make modifications and additions to that program.
- Demonstrate ability to use advanced data structures such as sets, stacks, queues, linked lists, maps, and trees.
- Demonstrate use and implementation of commonly used algorithms and data structures and select the appropriate algorithms and data structures to solve problems.
- Design and implement a program to efficiently solve computer-related problems of substantial complexity requiring a program between 500 and 2000 lines of working code, using structured procedural design methods, functional decomposition, and no global variables.

Textbook(s) used:

C++ Programming: From Problem Analysis to Program Design, 8th Edition
D.S. Malik
Cengage Learning, 2018
ISBN: 978-1-337-10208-7

Class Policy

- Arrive on time
- Raise your hand before speaking. If you have questions about what the teacher or classmates are talking about, you can write them down and ask when they finish.
- Do not work on different coursework if your work for this class is unfinished. That includes both classwork and homework.
- Respect the teacher, your peers, and yourself.
- Do not use your phone or walk out of the classroom without permission during a lecture, which includes breaks in between slides. You can do that when the teacher finishes her teaching.
- Please refrain from using your phone so that you are not distracted from your work because classwork is often due by the end of class.
- For PM students, you are allowed to have your lunch in class, but try to not make too much noise and be sure to clean up after yourselves.
- If you have a question or have any trouble understanding the course, please do not hesitate to ask the teacher for any clarification or assistance. You can ask during or after class, or send an email.

Submissions of non-code

Some assignments will not be code-based and those need to be typed **– not handwritten.** Either in a text document (.txt, .rtf, .md), word document (.docx), or PDF document.

Submissions of code

Throughout the school year, most submissions will be of source code files. Please follow these instructions when submitting

- If a program requires more than 1 file, please submit those individually, i.e., not as a zipped folder
- The detailed algorithm at the start of the code.
  - Explain step-by-step how your code works
  - The audience is anyone who is coming along to read your code
- The program must have a header at beginning of the code.
  - Title of program
  - Student ID
  - Date of Submission

Late Submission Policy:

If you are late in turning in an assignment it is 15% off for each day the assignment is late, i.e. if an assignment is due on Sunday, you have until that week's Friday to turn it in with a late penalty. Otherwise, it will be marked with a 0.

Grading

9-week (quarter) grades are computed as:

30% - Classwork
40% - Homework
10% - Quizzes
20% - Tests/Projects

Grading Scale
A 90-100
B 80-89
C 70-79
D 60-69
F Below 60

Grading Procedure

Dual Enrollment is Computer Science.

Dual enrollment is not an option in Senior Computer Science Course.

The decision to dual-enroll in a course requires careful consideration. You have options, as you can see from the DE module on Faculty Advising Canvas course. You may wish to contact your top choice colleges to ask what the impact of taking a dual-enrollment course might be for your goals, particularly if you do not perform to your expectations in the course. Please be aware that you are generating a permanent college transcript with all the courses for which you are dual-enrolled. You can also use the dual-enrollment student guide from Transfer Virginia to help you determine the potential impact.

If you choose to dual-enroll, you must monitor your course grade. If you find you are not earning grades you want to have on your permanent college transcript, you may consider dropping the dual-enrollment portion prior to the Add/Drop date for the term of the course, or to withdraw from the dual-enrollment portion prior to the Withdrawal date. If you choose to withdraw from dual enrollment for the class, you will still earn high school credit and can plan to be well-prepared for the class in college. Dropping will have no record on your transcript, while withdrawal will leave a note on your college transcript indicating you withdrew, but no grade will be recorded on your college transcript. You can request a decline or withdrawal form from me or from Mrs. Yee.

No matter what you choose to do, I will respect your wishes. I want to work with you to support your learning, but I cannot learn the information for you; you will have to invest effort in the course in order to succeed. This may require you to learn new learning strategies that you haven't used in the past. I will do my utmost to support your personal learning in the class and encourage you to pursue your goals.