**Computer Science 5012**

***Accelerated Structured Programming***

**Syllabus**

**Instructor:**

Mark Steven Gilland

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**Materials:**

# Textbooks

*Starting Out with C++, 7th ed. (ISBN: 9780132576253) by Gaddis, Tony. Addison Wesley*

# Software

Programmer's text editor (such as Visual Studio Code)

Compile Environment for Linux based Compiling

# General Statement

Computer Science undergraduate core for graduate students needing background. Covers programming techniques, data structures, and algorithms.

# Course-Level Learning Outcomes

After completion of the course, students will have met the following student learning outcomes:

* Understanding Abstract Data Types: motivations and basic concepts.
* Understanding of the behavior of basic data structures (lists, stacks, queues, trees (binary trees and tree traversals), graphs).
* Ability to analyze a problem and determine the appropriate data structure for the problem.
* Understand the importance of data modeling and data structures in advanced programming.
* Understand and analyze elementary algorithms: sorting and searching.
* Ability to analyze the impact of data structures technique on the performance of algorithms (time and space complexity)/programs.
* Data structure implementation issues. Understanding of dynamic versus array implementations of data structures, factors involved in deciding on an implementation technique.
* Practice in writing modular programs using the data structures that have been studied.
* Understanding the mechanics of code design, organization, and the development environment.
* Understanding data structure implementation in C++ using header files and implementation files.
* Demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.

# Degree Level Outcomes

* attain the ability to apply knowledge of computing and mathematics appropriate to the discipline.
* attain the ability to analyze a problem and identify and define the computing requirements appropriate to its solution.
* attain the ability to communicate effectively with a range of audiences.
* attain the ability to use current techniques, skills, and tools necessary for computing practice.

# Scheduled Topics

* C++: types, operators, variables, program structure/syntax
* Selection and repetition
* Functions (pass-by-value and pass-by reference)
* Recursion: Writing recursive functions.
* Direct and indirect recursion
* Introduction to complexity analysis
* Vectors
* Files
* Sorting, searching (BubbleSort)

# Course Website

* Homework, resources, and current scores for the course will be posted at:

<http://cscade.cs.astate.edu>[.](http://cscade.cs.astate.edu/)

* Additional information is available on the course github at:

<https://github.com/gilland-astate/accelerated-fall2021>

# Attendance Policy

Attendance will be taken each day. If you must miss a class, it is your responsibility to cover the material that was covered in class on that day. Check the course website and contact the course instructor if you must miss a class. If you must miss an exam, quiz, or other in-class assignment, you should alert the instructor before the class meeting; failure to do so may result in your being unable to make up the work. Any arrangements for make-up exams, quizzes, or other in-class assignments will be expected to result in completion of the work within three business days of the absence except in extreme circumstances.

# Grades

Homework will be assigned regularly to reinforce the lecture material. The homework due dates will be posted with the assignment. Assignments will be graded according to the criteria posted at http://wiki.cs.astate.edu/index.php/CS482V\_Grading\_Guidelines. Late homework will not be accepted.

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| **Grade Breakdown** |  | **Grading Scale** |
| Class Participation | 10% | 90 - 100 A |
| Homework | 25% | 70 – 89 B |
| Exams | 40% | 50 – 69 C |
| Final Exam | 25% | < 50 F |
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# Classroom Courtesy

Please be respectful of others and realize that this is a learning environment. Discussion is encouraged, but please try to remain on-topic. Always be on time for class (excessive tardiness will count as absence). Although you are encouraged to discuss problems and assignments with each other, cheating (including, but not limited to, plagiarism) is unacceptable and will not be tolerated. If you are caught cheating, you will receive a zero score for that assignment and the Department and/or University may choose to take further action (See the Academic Misconduct Policy in the ASU Student Handbook. Turn off or silence all cell phones and other noisy electronic devices (including music players) during class. All electronic equipment is prohibited during exams, and all caps or hats which cover the eyes must be removed or turned backward. Students who become disruptive to the class will be asked to leave.

# Additional Information

Students who require academic adjustments in the classroom due to a disability must first register with ASU Disability Services. Following registration and within the first two weeks of class, please contact me to discuss appropriate accommodations. Appropriate arrangements can be made to ensure equal access to this course.

Official grades must be obtained from the Student Self-Service website, or in. Neither the department secretaries nor I can discuss grades over the phone. You can track your progress in this course from the "Grades" section of the CSCADE [(](file:///C:\Users\steve\Downloads\()[http://cscade.cs.astate.edu)](http://cscade.cs.astate.edu/) website.

Any other questions should be directed to the course instructor through email. This is a general policy statement and is subject to change by the instructor. More policies and information are available on the course website. Please read and be familiar with the information there as well.