



## C++ Programming

### CPSC 2320

## Instructor Info —

**Name:** Tyler Williamson  
**Office Hours:** M T W: 3-5pm, W F: 12-1 pm  
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## Course Info —

**Prereq:** CPSC 1500 or ENGR 2310  
**Meeting Days:** Thursday  
**Meeting Times:** 12pm-1:50pm  
**Location:** Hartung 318

### Overview

This course will provide an introduction to the C++ programming language and is intended for students who are already familiar with computer programming in at least one other language. C++ is a large and complex language with many features. A detailed treatment of every aspect of the language is not feasible for a one-credit-hour course; rather this course will act as an introductory tour of the language which demonstrates the basic syntax and core features of C++. Special attention will be given to the aspects of C++ which are most useful for scientists and engineers, and most course assignments will reflect this.

*Note: This is an entirely in-person course, although material will be replicated online to accommodate ill or quarantined students.*

### Material

**Required Texts**  
None

### Recommended Text

- Bronson, G.J. *C++ for Engineers and Scientists*. 4th Edition. Cengage Learning. 2012.
- Stroustrup, B. *A Tour of C++*. 2nd Edition. Addison-Wesley Professional. 2018.

**Required Software**  
Eclipse IDE for C/C++ (free)

### Grading Scheme

		$grade \geq 93$	A	$73 \leq grade < 77$	C
Homework	30%	$90 \leq grade < 93$	A-	$70 \leq grade < 73$	C-
Labs	20%	$87 \leq grade < 90$	B+	$67 \leq grade < 70$	D+
Midterm Project	20%	$83 \leq grade < 87$	B	$63 \leq grade < 67$	D
Final Project	30%	$80 \leq grade < 83$	B-	$60 \leq grade < 63$	D-
		$77 \leq grade < 80$	C+	$grade < 60$	F

*Note: As the instructor, I reserve the right to change the grade of any student, but only to that student's benefit and only under exceptional circumstances.*

### Learning Objectives

- Develop proficiency in the core features of C++ (syntax, flow of control, data types, functions, arrays)
- Become familiar with the C++ standard library
- Be introduced to more advanced C++ features (pointers, classes, templates, modularity)
- Become familiar with the language-machine interaction, especially the compiling and linking process
- Learn to write C++ programs to solve complex engineering problems

*Note: This course is included in the ABET accreditation process for Engineering and addresses Student Outcome 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.*

## Course Requirements

### Homework

Homework will be assigned in class irregularly and will be submitted on Canvas.

### Labs

Labs are meant for in-class practice to supplement the lecture and will be submitted on Canvas.

### Projects

Projects will be assigned in lieu of exams. Projects will be completed outside of class and will be designed to assess your mastery of the material taught in class. There will be two (2) projects: a midterm project, and a final project which will replace the final exam. Projects will be submitted on Canvas.

## COVID-19 Statement

As a member of the AU community, we acknowledge our covenant to protect and care for each other by embracing the following measures in this class: wearing a facial covering, maintaining 6' physical distance from others, practicing good respiratory hygiene, and using hand hygiene.

Due to the unpredictable nature of the COVID-19 pandemic, and factors that are out of control of the instructor, students should be prepared for a (possibly abrupt) pivot in instruction mode. In that situation, learning objectives for the course will remain the same, however the instructor reserves the right to modify due dates as well as the number and frequency of assignments, quizzes, and exams. Any such changes will be communicated via AU email and Canvas.

During this coronavirus pandemic, the AU faculty and staff are making every effort to provide the best possible environment for face-to-face (F2F) instruction, as well as the best online environment, if we are forced to transition online. We encourage you to follow the community covenant, both on campus and off campus, in your educational environments as well as in your social environments. These guidelines are intended to maximize the amount of F2F instruction, by reducing the transmission rate of the coronavirus on campus and in the surrounding community. **As such, all Physical Sciences and Engineering department classes taught in face-to-face format will require properly worn facial coverings, 6' physical distancing, and good respiratory and hand hygiene.** Note that accommodations will be made for cases approved by the University for those students who cannot wear a facial covering for health reasons.

The department faculty will facilitate learning in this pandemic environment through the use of tools such as email, Canvas (learning management system), Kaltura (recording F2F lectures and labs), and/or other educational tools. These tools allow for flexible learning, in the cases where students are unable to attend class in person, either through illness, quarantine, the need to care for family members, or other situations.

It is imperative that we work together to slow the spread, through the community care covenant. It is very important that we communicate clearly with each other, extending grace towards each other, and solving problems together. Please contact your professor and/or the chair of the Physical Sciences and Engineering department, Dr. Benjamin McPheron, with any concerns, and keep us up to date regarding any changes in your class attendance.

## Attendance Policy

Class attendance is fundamental to the teaching/learning process and any absence from a class results in a loss of learning for the student and learning community. In the current pandemic environment, it is imperative that we balance our face-to-face learning with the risk posed by the coronavirus. For this reason, if you need to miss class for any reason (such as feeling a little under the weather), participation in the equivalent online activities will not count as an absence presuming, if applicable, any required assignments are completed. It is the student's obligation to personally notify the course instructor when not attending the class face-to-face, in advance if possible, and to complete the required assignments for that class session prior to the due date, or at a modified date at the discretion of the instructor. In the case of an extended illness or a mandated quarantine, notify the professor as soon as possible to discuss options for modified due dates or other accommodations.

## Academic Integrity

As an institution of higher education committed to academic and Christian discovery, Anderson University expects faculty and students alike to maintain the highest standards of academic and personal integrity. “Anderson University seeks to support and promote qualities of academic honesty and personal integrity and regards cheating, plagiarism, and all other forms of academic dishonesty as serious offenses against the University community” (Faculty Handbook 4.23 Policy on Academic Integrity). See the student handbook for examples of plagiarism. When an instructor has additional definitions of academic dishonesty, they must be stated in the Syllabus at the beginning of the course.

You are expected to do your own work in this course. Code from other sources, such as books, online help, or advice from a classmate is allowed, but must be cited in your work (include at least a link/reference to the source). The work you turn in must be substantially your own. Any incidences of academic dishonesty will be handled according to University policy.

## Academic Support

### Accessibility and Accommodations

Important: If you have any special accessibility needs (i.e. use of screen reading software, captioning, etc.), please notify your professor and the Director of Disability Services for Students (Kissinger Academic Center for Excellence, Nicholson Library; 765-641-4223) as soon as possible. If you anticipate or experience physical or academic barriers based on disability, you are encouraged to contact the Director of Disability Services for Students (Kissinger Academic Center for Excellence, Nicholson Library; 765-641-4223). To receive reasonable accommodations, you must contact Disability Services for Students, provide documentation, and request accommodations. You should also notify your course instructor during the first week of classes.

### Kissinger Academic Center for Excellence

The Kissinger Academic Center for Excellence (KACE), located on the ground floor of the Nicholson Library, provides excellent resources in all areas of study regardless of academic ability. Many students can benefit from academic support and/or sharpen their skills through studying with others. In addition, excellent students often maintain their skills by working as peer tutors. The services are available for all enrolled students at no charge. For information, call 765-641-4225.

### Pathways Program

Anderson University has a robust referral system that was created to connect students with the campus resources that will be most beneficial to them. Students may be referred by faculty for any student success issue. Students will be contacted by an appropriate staff or faculty member to provide support and care. For more information please see: [anderson.pharos360.com](http://anderson.pharos360.com).

## Diversity and Inclusivity Statement

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

## Class Schedule

*Subject to change*

Week 1	Intro to C++: Syntax, Data types, arithmetic, declarations, and assignment statements	Bronson, 1.5A, 2-3 Stroustrup, 1
Week 2	Flow of control (loops, conditional logic)	Bronson, 4-5 Stroustrup, 1
Week 3	Functions and Arrays	Bronson, 6-7 Stroustrup, 1
Week 4	The C++ Standard Library	Bronson, 7.6 Stroustrup 8,11,12
Week 5	Modularity and Header files	Bronson, 6 Stroustrup, 3
Week 6	Fall Break (Work on project 1)	
Week 7	I/O, Data Files, and Strings	Bronson, 8-9 Stroustrup, 9-10
Week 8	Error handling and unit tests	Bronson, 9
Week 9	Pointers and dynamic memory allocation	Bronson, 10 Stroustrup, 1
Week 10	Classes and structures I	Bronson, 11-12 Stroustrup 4
Week 11	Classes and structures II	Bronson, 11-12 Stroustrup, 4
Week 12	Advanced topics: The Eigen library	
Week 13	Thanksgiving Break	
Week 14	Advanced topics: Templates	Stroustrup, 6
Week 15	Review	