

**C++ Programming II**

CS 111

Spring 2021

* 3 credits
* Prerequisite: CS 110
* Instructor: [Brother David Carlson](https://cis.stvincent.edu/cis/FacultyInfo/BrDavid.php)
* Office: Dupre Science Pavilion, Tenley Hall W217
* Office hours via Zoom, email, phone, or socially distanced in the atrium. . Email me if you want to request a Zoom meeting.
  + Mon 2:00 pm - 4:30 pm
  + Tue 8:45 am - 11:20 am
  + Tue, Thurs 2:30 pm - 4:30 pm
  + and by appointment
* The CIS lab in W214 of the Dupre science complex will be available according to a schedule that will be posted after classes start. The CIS tutors often work in this room (or by Zoom).
* Phone: 724-805-2416
* Email: [david.carlson@stvincent.edu](mailto:david.carlson@stvincent.edu)
* Class Times and Location
  + Tue, Thurs 1:00 pm - 2:15 pm, Dupre W214
* Date of Final Exam
  + Wed, May 19, 11:00 am - 1:00 pm

**Course Description**

A study of advanced programming techniques and applications continuing from the point where CS 110 ended. Elementary data structures and associated algorithms are examined. Topics covered include arrays, strings, file processing, classes, stacks, queues, linked lists, and recursion. Prerequisite: CS 110

**Required Text and Other Materials**

Text: Problem Solving with C++, 10th ed., Savitch W., McGraw-Hill (2018), ISBN 978-0-13-444828-2. Most students will already have the appropriate text from CS 110, but if you need to get a text, try to get the version of the text with an access code for MYPROGRAMMING LAB included, as homework will be assigned in MyProgramming Lab. If you get the version of the text without the access code to use MYPROGRAMMING LAB, you can purchase an access code for about $40 at the MYPROGRAMMING LAB web site: <https://mlm.pearson.com/northamerica/myprogramminglab/>

* NOTE WELL: This access code is NOT the same as the access code to the Companion Web Site. Your textbook may contain this access code on the inside of the front cover, but that is not the code that you need, and we will not use the Companion Web Site.
* Most students will have the correct textbook from their CS 110 course, but if you do not, be sure to get the right edition (the 10th) of the text as the MYPROGRAMMING LAB homework problems are NOT the same for other editions.
* If you had an access code for CS 110 last semester, that code is associated with the CS 110 course and will not show you the problems to do for CS 111. I do not know if it is possible to associate a previous access code with a different course, even though the text is the same. You might try asking online at the MYPROGRAMMING LAB web site.
* At that same website, <https://mlm.pearson.com/northamerica/myprogramminglab/>, click on Student underneath the words: Register Need Access? Start Here! This is where you sign up to use this online homework system. You will need to supply our course ID, which is SAIN-46844-XXXX-47and either pay by credit card or PayPal (unless you have a MyProgrammingLab code that in effect says that you paid for this service when you bought the textbook). This process should end by giving you a username and password for logging into this same MYPROGRAMMING LAB site to do homework for our course.

Besides reviewing topics from CS 110 (such as functions, arrays, and strings) we cover much of chapters 9, 10, 11, 13, 14, and 15 in the text. We also do much of the intermediate section of [Software Design Using C++](https://cis.stvincent.edu/html/tutorials/swd/index.html), which covers a lot of the same topics. This collection of web pages is abbreviated as SWD below.

**Course Learning Objectives**

By the end of the course, students will be able to:

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| 1. Design, write, and debug programs with lengths up to about 8 pages of code, using good software engineering techniques, programming style, documentation, and practices. 2. Write programs that exhibit modular programming with appropriate use of functions, parameters, and classes. 3. Use, and in many cases implement, a variety of data structures, such as stacks, queues, and linked lists -- as well as typical associated algorithms for operating on those data structures. 4. Describe basic aspects of software engineering and how they apply to producing better software. 5. Identify elements of the ACM Code of Ethics that apply in software development case study situations. |

**Relevant CIS Department Student Learning Outcomes**

By the time of graduation, the CS, IS, or Cybersecurity major will have:

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| 1. An ability to analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions. 2. An ability to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements in the context of the discipline. 3. An ability to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. |

**Course Schedule**

Note that homework is done in MyProgrammingLab (abbreviated as MPL below), but larger programming projects (labelled with PRJ) are done in Visual Studio and submitted in Schoology. Due dates are posted in Schoology. The schedule below merely attaches assignments to the correct spot in the course.

In this course we expect to have approximately half of the students in attendance at each class session, with the other half being in an online Zoom session at the same time. In the next class session, the two halves change locations, so that those who were online are now physically in class, etc. Which students, group A or group B, are to attend each in-class session will be explained just before the first week of classes after each student is assigned to group A or B.

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| Date | Topic | Assignment |
| Wk 1, Feb 9, A | syllabus, program formatting, documentation, review of assignment statements, conditions, IFs |  |
| Wk 1, Feb 11, B | review of loops, functions, parameters | email your prof |
|  |  |  |
| Wk 2, Feb 16, A | review of arrays and C-style strings | MPL 2.4, 3.2, 3.3 |
| Wk 2, Feb 18, B | review of string class, ch 8, how to use Visual Studio as well as the debugger | MPL 3.4, 4.2, 4.3 |
|  |  |  |
| Wk 3, Feb 23, A | review of text file streams and using objects; SWD and  ch 7: more on arrays | MPL 5.1, 5.2 |
| Wk 3, Feb 25, B | SWD and ch 7: more on arrays, parallel arrays, 2D arrays | MPL 6.1, 8.1, 8.2  assign PRJ 1 |
|  |  |  |
| Wk 4, Mar 2, A | More on 2D arrays, ACM code of ethics: ethical, social, professional guidelines <https://www.acm.org/code-of-ethics>, SWD: software engineering, structure charts, flow charts, etc. | MPL 6.2, 6.3, 7.1, 7.2 |
| Wk 4, Mar 4, B | SWD and ch 7: bubble sort, sequential search, selection sort | MPL 7.4,  PRJ 1 part A due |
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| Wk 5, Mar 9, A | SWD and ch 7: binary search, SWD and ch 10: structures, structures containing arrays and/or structures, review |  |
| Wk 5: Mar 11 | Exam 1 on CS 110 review material, functions and parameters, text files, software engineering, strings, arrays, sorting and searching, most of chapters 7, 8 | Exam for all in Rogers Center |
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| Wk 6: Mar 16, B | Arrays of structures, SWD and ch 9: pointers, dynamic memory allocation & de-allocation | PRJ 1 part B due |
| Wk 6: Mar 18, A | SWD and ch 10: objects and classes, abstract data types | PRJ 1 part C due, assign PRJ 2 |
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| Wk 7: Mar 23, B | SWD and ch 10: more on objects and classes, arrays of objects | MPL 9.1, 9.2, 10.1 |
| Wk 7: Mar 25, A | SWD and ch 11: more complex object-oriented features such as overloaded operators | MPL 10.2 |
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| Wk 8: Mar 30, B | SWD and ch 11: more complex object-oriented features (overloaded operators, dynamic allocation of objects) |  |
| Wk 8, Apr 1, A | SWD: binary file streams, random access | MPL 11.1, 11.2, 11.3, 11.4 |
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| Wk 9: Apr 6, B | review | PRJ 2 due,  assign PRJ 3 |
| Wk 9: Apr 8 | Exam 2 on pointers, dynamic memory allocation & deallocation, files, structures and classes, much of chapters 9, 10, 11 | Exam for all in Rogers Center |
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| Wk 10: Apr 13, A | SWD and ch 13: linked lists |  |
| Wk 10: Apr 15, B | SWD and ch 13: linked lists and queues |  |
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| Wk 11: Apr 20, A | SWD and ch 13: linked lists, in-class exercise on tracing and/or writing code to process a list, queues, trace results if a list object is passed as a value parameter but there is no copy constructor | PRJ 3 part A due |
| Wk 11: Apr 22 | Break: no class |  |
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| Wk 12: Apr 27, B | SWD and ch 13: stacks, stack algorithms | PRJ 3 part B due,  assign PRJ 4 |
| Wk 12: Apr 29, A | Inheritance: SWD and ch 15 |  |
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| Wk 13: May 4, B | SWD and ch 14: recursion | MPL 15.1 |
| Wk 13: May 6 | SWD and ch 14: recursion, quicksort, and mergesort |  |
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| Wk 14: May 11, A | secure and insecure programming | MPL 14.1, 14.2, 14.3 |
| Wk 14: May 13, B | ACM code of ethics: ethical, social, professional guidelines, review | PRJ 4 due |
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| Finals Week: Wed, May 19 | Cumulative final exam, but emphasizes last third of course. 11:00 am - 1:00 pm | Exam for all in Rogers Center |

**Course Requirements and Grading**

* Homework in My Programming Lab: 20%
* Programming projects in Visual Studio: 20%
* Exams (2): 20% each
* Final exam: 20%

Bonus: An additional 1.5 points will be added to the final number of points at the end of the semester for any student who attends two-thirds of the Collaborative Learning Program (CLP) sessions for this course. For example, there may be 15 CLP sessions, so if a student attends at least 10 of these sessions in their entirety, and ends up with a grade of 78.5 (which is a C+), an additional 1.5 points will be added to the grade, resulting in a revised grade of 80.0 (which is a B-).

Letter grades will be assigned according to the scheme found in the current College Bulletin. Exams will be announced in advance and (assuming that we have not had to switch to online classes) will be closed-book, pencil and paper exams in nature, except that you may use one two-sided 8.5 in. x 11 in. page of notes of any kind. Thus, on exams, only the test paper, calculators, the one page of notes, pens, pencils, and erasers may be used. Cell phones, tablets, laptops, PCs, and similar devices should be turned off and put away. Calculators may be used on exams but are not to be shared among students.

On a practical level, strive to do well in the course: **work on your programming projects over the week or so before each is due -- not at the last minute**, read the text and web pages of materials, attend class, do the work, ask questions, and try to answer questions in class! Programming and computer science are not spectator sports! They require active participation and repeated practice. If you begin to feel lost, consult one of the tutors, attend a CLP session, or send a message to the instructor. Do not let yourself get behind. In fact, one key to academic success is to start early on homework, projects, and other tasks. Last-minute miracles seldom work! Note in particular that attendance (in-class or online) is important. Student performance is bound to deteriorate when classes are missed.

Tests will ask critical thinking questions that require careful analysis, explanation, and conclusions. For example, you might be presented with a section of a program and asked to trace what it produces, to write the documentation describing at a high level what this section does, or to give an alternative implementation of this section. You might also be asked to write a section of code that carries out a particular task. A few multiple choice or true/false questions may also be included. In this course you will be asked to write programs that are about 2 to 8 pages in length, including well-written documentation.

Homework will be short programming exercises in My Programming Lab. These allow you unlimited attempts and tell you if you have or have not been successful in solving the programming problem. Projects are longer programming assignments done in Visual Studio. Here is where you show that you can produce useful software that meets its requirements. Programming involves typing code into a source file, compiling it, testing it, and fixing it as necessary. It requires careful work and cannot be completed in one sitting. **Work on your programming projects over the week or so before each is due -- not at the last minute.** Plan to have each project done early so that there will be time to test it and to fix the problems that testing usually reveals. That also gives you time to ask the instructor for assistance. Note that a programming project nearly always takes longer than you expect! Last minute attempts are bound to fail. That holds true whether you are working on a huge million-dollar software project or a project in this course. **Projects must be done separately by each individual** unless the instructor tells you otherwise. **Do not ask a fellow student in the class how to solve the problem or ask to see that person's code, as that is plagiarism!** You may consult only the tutors or the instructor for homework and programming project help.

Watch Schoology for details of assignments, their due dates, etc.

Make-up exams are discouraged. If possible, take the regularly scheduled exam. However, see your instructor ahead of time if you know you must miss an exam and consult with your instructor for any other situations involving missing an exam.

**CIS Department Policies**

As much as possible, the CIS Department faculty intend to keep a traditional lecture schedule this semester. Bear in mind, policies may change during the semester as the covid situation changes. Please refer to the Department’s website for the latest information. Here are our policies:

* We will provide normally scheduled lectures. Depending on the class, we may offer synchronous on-line lectures, recorded lectures, or some other format. Faculty will provide specific instructions for their classes in their syllabi.
* Given lecture-room capacity limitations due to the College’s covid response, you may be asked to attend in-class lecture only once or twice per week. For all other lectures, you must attend the synchronous, on-line lecture for your class.
* If you cannot attend synchronous, on-line lectures, the faculty will accommodate you. The form of accommodation will vary among classes. The faculty will **not** normally publish lecture recordings.
* Usually, assignments will be distributed and collected through Schoology. Some classes, however, may use different websites for homework and projects.
* The College has allowed office hours and group meetings (e.g., research, senior-project teams) to be held via Zoom. Check the syllabus for your class to determine how and when office hours will be held. Faculty will make available in their syllabi both the methods and times when they will be available for office hours. Please use those hours!
* Tutoring and CLP sessions will be delivered via Zoom. Schedules will be posted on the department’s website <https://cis.stvincent.edu> .
* Please use the same seat throughout the term to minimize contamination and to aid faculty in taking attendance. Faculty must take attendance in each class for contact tracing if there is a covid case on campus. Attendance policies are given in the course syllabus. Please read it.
* When working in teams, remember to follow the College’s policies for distancing and masks.

**Course Policies**

*Academic Honesty Policy*

Saint Vincent College assumes that all students come for a serious purpose and expects them to be responsible individuals who demand of themselves high standards of honesty and personal conduct. Therefore, it is college policy to have as few rules and regulations as are consistent with efficient administration and general welfare. Fundamental to the principle of independent learning and professional growth is the requirement of honesty and integrity in the performance of academic assignments, both in the classroom and outside, and in the conduct of personal life. Accordingly, Saint Vincent College holds its students to the highest standards of intellectual integrity and thus the attempt of any student to present as his or her own any work which he or she has not performed or to pass any examinations by improper means is regarded by the faculty as a most serious offense. In any case of academic dishonesty, the faculty member together with the Assistant Vice President for Student Success and Retention, who confers with the student, decide on the appropriate sanction. Depending on the seriousness of the offense, possible sanctions are failure for the assignment, failure for the course, suspension or expulsion. If a student receives the sanction of a failure for the course during the withdrawal period and drops the course, a WF will be recorded on the transcript.

**In this course, students are expected to do entirely their own work on the exams, homework, and programming projects**. Every programming project should list all sources that contributed to the solution. This would include the individual student. It may also include the instructor, a reference book, a web site, or one of our tutors. Web sites that simply give you a solution to a programming project are **not** to be used. You may consult other students who are not our tutors **only** to clarify what the project assignment is asking. If you need assistance beyond simple clarification of the description of the assignment, consult the instructor or one of our tutors. Although tutors may well be helpful, only the instructor is likely to know the full details of the project. **You may not look at the project code for another student in this course or show yours (even a part of it) to another student in the course. You may not work out the design or code for a project with one or more persons other than the tutors and the instructor. If you break one of the conditions spelled out here, then this is a case of academic dishonesty**. See above for how this gets handled and the possible consequences.

*Appropriate Academic Use of Recordings*

Please be advised that elements of this course may be recorded for the sake of students in need of certain accommodations. This recording may include any contributions you make during the class sessions by answering/asking questions or making presentations. If you have concerns about being recorded, please contact your professor before class to discuss those concerns and the possibility of other ways that you might contribute.

All students are expected to use recorded course material only for their own personal academic use. Recorded content may not be shared with others outside of the course, unless the instructor has given explicit permission for the student to do so.

Violations of this policy will be reported to and addressed by the Office of Student Conduct. Behavior that constitutes a violation of academic integrity will also be reported to Academic Affairs as such and may incur additional sanctions.

*Attendance Policy*

Saint Vincent College recognizes that the current pandemic situation complicates face-to-face attendance for many students. The tradition of face-to-face classes is at the heart of a liberal arts education and we value the way that being physically present in the same space promotes dynamic interactions and community building. As such, we are making these opportunities available as much as possible. At the same time, in order to minimize risk of disease transmission, SVC has modified classroom arrangements and instructors are modifying their modes of instruction to make the best and safest use of space, while also utilizing technology-based modes of instruction that have been shown to meet our learning objectives. The Saint Vincent policy for Fall 2020 and Spring 2021 is that no student can be penalized for not being physically present in a classroom.  Each instructor will establish a course-specific attendance contingency plan that incorporates alternative modes of instruction and attendance for students who are required to quarantine, or who have secured accommodations through Ms. Marisa Carlson, the Director of COVID-19 Accommodations.

In this course, students who cannot attend in-person classes for any reason, including because only half of the students can be in class on any given class day, should attend virtually through the live Zoom conference. If, for a good reason, a student cannot attend in-person or by means of the live Zoom conference, a recording of the conference may be made available to that student, but recordings are not normally made available to the class.

* Each unexcused absence after the first 3 results in 1.5 percentage points being deducted from the final course grade.
* Arriving late for class or leaving early (without a proper excuse) is counted as 1/2 of an absence.
* An unexcused absence from an exam results in the failure of the course.
* Unexcused absence from more than one-third of the semester's classes results in the failure of the course.
* Attendance is used to decide borderline grades at the end of the semester.
* Late work is not normally accepted, but partial credit is given for incomplete work that is submitted on time.
* Email me if you must miss class (in-person or online) for any reason, whether it is due to an illness or some other issue. It is always best to let me know instead of leaving me to wonder why you are not in class.
* Because of the possibility of the covid-19 virus, the flu, or other communicable diseases affecting us on campus, please practice good hand washing, wearing of masks, staying at least 6 feet apart, etc. If you get ill, please notify me and follow good medical advice and college policy. Check with me about what you miss. You are still responsible for all course material, but an incomplete grade can be given if you cannot finish the course in the given time frame. See the Saint Vincent College Covid-19 Updates at <https://www.stvincent.edu/resources/covid-19-updates/index.html> .

*Class Cancellation Policy*

If the instructor needs to cancel class, every effort will be made to send an email message to students' Saint Vincent email accounts and/or to place a note on the course Schoology page.

*Classroom Etiquette*

An essential characteristic of Saint Vincent College is the dignity and civility with which students and instructors conduct themselves both inside and outside the classroom. All students share in the responsibility of making the classroom, whether physical or virtual, a positive place to learn. Attendance is more than just being in the classroom or logged in to the course. Students are expected to be prepared, attentive, and respectful of others.

*Accessibility Statement for Students with Disabilities*

Students with disabilities who may be eligible for academic accommodations and support services should contact Ms. Marisa Carlson, Assistant Dean of Studies, by email (marisa.carlson@stvincent.edu) to schedule a meeting. Reasonable accommodations do not alter the essential elements of any course, program, or activity. The Notification of Approved Academic Accommodations form indicates the effective date of all approved academic accommodations and is not retroactive.

Title IX Statement

Saint Vincent faculty are committed to helping create a safe learning environment for all students and for the college as a whole. If you have experienced any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, intimate partner (dating or domestic) violence, sexual exploitation, or stalking, know that help and support are available. Saint Vincent College has staff members trained to support students in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The College strongly encourages all students to report any such incidents.

Please be aware that all Saint Vincent employees (other than those designated as confidential employees such as counselors, clergy and healthcare providers) are required to report information about such discrimination and harassment. This means that I have a mandatory duty to report to the Title IX Coordinator any information I receive about possible sexual misconduct.  This includes information shared in class discussions or assignments, as well as information shared in conversations outside class.  The Title IX Coordinator will contact you to inform you of your rights and options and connect you with support resources, including possibilities for holding accountable the person who harmed you. Know that you will not be forced to share information and your level of involvement will be your choice. The purpose of reporting is to allow Saint Vincent to take steps to ensure that you are provided with any necessary resources needed and to provide a safe learning environment for all.

The College’s Title IX Coordinator is:

Eileen K. Flinn, Esq.

Saint Vincent College

Second Floor, Alfred Hall

724-805-2897

The College also has confidential resources available, who can provide assistance to those who have experienced sexual misconduct without triggering a mandatory reporting duty.  More information about confidential resources is available on the [Saint Vincent Student Life page](https://www.stvincent.edu/student-life/title-ix).

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Campus Ministry at 724-805-2350 or the Wellness Center in the Carey Student Center at 724-805-2115. For more information regarding your rights and options, please see the Sexual Misconduct and Harassment policy which can be found on the MySV portal under Quick Links or on the [Saint Vincent Student Life page](https://www.stvincent.edu/student-life/title-ix).