DMACC
DES MOINES AREA COMMUNITY COLLEGE

http://www.dmacc.edu

# Course Syllabus

## Course Information

**Campus Name:** Ankeny
**Course Title:** C++
**Course Number:** 161
**Section Number and CRN:** WW1 20447

**Semester:** 202402 Spring 2024
**Days & Times & Location:** 01/08/24-05/02/24 Bldg: Online Room: WEB

**Course Description:** Students will examine the structure of typical C++ programs, explore the concepts of object-oriented programming and design business applications in C++.
**Course Credits:** 3

This is a DMACC college-level course. The content is college-level and follows the DMACC Syllabus, meeting the objectives and rigor of DMACC and its accrediting bodies.

**Course Competencies**

1. Utilize an Integrated Development Environment (IDE)
    1. Write, compile, link and execute a simple C++ program to produce a working application
    2. Use the native debugging tools
2. Perform basic C++ syntax, coding structures and operations
    1. Use C++'s primitive data types as variables and constants including data type conversion (casting)
    2. Use the iostream class for appropriate input and formatted output (cin, cout)
    3. Investigate the different uses of the assignment operator (=, +=, x=y=z)
    4. Distinguish among relational operators

5. Use relational and logical operators to write repetitive control structures (for, while, do..while)
6. Use relational operator to write selection control structures (if, if..else, switch)
7. Include logical operators in control structures
8. Demonstrate error handling and input validation
9. Use sentinel values, break and continue to control program flow

3. Investigate the concepts of structures and enumerations
    1. Distinguish between structure objects and a structure's definition
    2. Show how to access a structure's members
    3. Demonstrate the use of enumerated data types
4. Outline the various components of a C++ function
    1. Illustrate passing arguments to functions and returning values from functions
    2. Distinguish between passing by value and passing by reference
    3. Demonstrate function overloading
    4. Write in-line functions
    5. Write prototype functions
    6. Demonstrate the ability to use functions to refactor code
    7. Demonstrate the use of pointers as function parameters
5. Examine arrays
    1. Define and process a one-dimensional array
    2. Define and process multi-dimensional arrays
    3. Define and process arrays of object-oriented data
    4. Pass arrays to and from functions
    5. Demonstrate the use of arrays with pointers
6. Analyze the concept of C++ classes and objects
    1. Demonstrate the advantages of using classes in C++
    2. Identify when to apply public, private and protected
    3. Write and use mutators and accessors
    4. Demonstrate object initialization using constructors
    5. Use constructor overloading
    6. Write code organized in header and source files
    7. Show how to use objects as function arguments and return types

7. Create code using inheritance and polymorphism
    1. Design a program using base and derived classes
    2. Write functions that override base class member functions
    3. Demonstrate the use of virtual to enable runtime polymorphism
    4. Diagram class hierarchies and relationships between classes
    5. Design an object-oriented program using is-a versus has-a relationships
8. Examine the use of pointers in C++
    1. Explain the idea of addresses and pointers
    2. Illustrate the use of the reference operator (&)
    3. Declare and initialize pointers
    4. Dereference pointers
    5. Demonstrate use of relational operators in pointer comparisons
9. Illustrate C++ file input/output through stream classes
10. Demonstrate code readability, application testing and communication to other developers
    1. Demonstrate the use of comments, good code layout and coding conventions
    2. Develop strategies for testing your program including the use of unit testing framework

**Des Moines Area Community College Essential Learning Outcomes**

**Outcome 1: Discipline Knowledge**
Students will be able to understand and apply discipline knowledge foundational to study within a single course or an entire program.

**Outcome 2: Critical Thinking**
Students will be able to analyze complex information, support arguments with credible evidence, and reach well-reasoned conclusions.

**Outcome 3: Communication Skills**
Students will be able to communicate clearly and effectively within the appropriate context.

**Outcome 4: Problem-Solving**
Students will be able to define, identify, and analyze problems before applying a successful solution.

**Outcome 5: Collaboration**
Students will be able to apply the skills and attitudes necessary for effective teamwork, including interpersonal communication, project management, and leadership.

Semester/Year: Spring 2024

Date Syllabus Created and/or Revised: 1/5/2024

Course Overview: •This course introduces you to C++ functional programming and how to use an IDE (Integrated Development Environment). It will engage students in the exploration of functional programming in C++ to program, test, and debug efficiently with a pragmatic approach. A variety of topics such as data types, control flow, function, stream input/output, coding tips, good practices, and more will be covered. There will be hands-on programming practices with covered topics.

Study Expectations/Tips: This is a fast-paced, hands-on class. The content of this course builds on itself throughout the semester. Consequently, it is essential that students master early concepts as they become building blocks for concepts introduced later in the class. It is realistic to spend at least 8 hours per week studying for this class. To do well in this class, you must

• It will be necessary to practice/experiment with examples provided in each module to further your understanding of the concepts they represent. This desire to learn is crucial to your success in this class and your future career.

• You must access the Canvas course regularly. However, just accessing Canvas does not count for attendance. You must also regularly complete and submit your homework.

• Students should seek extra help if they feel they are getting behind on course material.

## Instructor Information

**Name:** Belinda Patton
**Email:** bpatton2@dmacc.edu
**Phone Number:** 515-965-7329
**Office Location:** Kaltura Media Gallery
**Office Hours/Appointments:** Monday and Thursday, 8:00 am – 12:00 pm CST by appointment. Please email to schedule an appointment. Appointments will be conducted using the Kaltura Meeting link on Canvas.
**Instructor Introduction:** Please see information about me by visiting the “Your Instructor” section in Canvas.

## Textbooks & Materials

**Required Textbooks & ISBN: None**
**Technology Needs:** Computer (PC with at least Windows 10 or Mac), Internet access, and a headset with microphone for meetings with the instructor. No Chromebooks

**Required Materials:** Zybooks Subscription

## Attendance / Participation

DMACC requires that I report all students who have not attended/participated in our course during the first week. To not be dropped for nonattendance, you must complete the following activities in our course within the first week of the course. Specific deadline denoted on Canvas assignment. Activities include:

• Log into Canvas

• Participate in the Introduce Yourself discussion board

• Complete the Module 1 Assignments

DMACC requires that I report grades for all students at the midpoint in the semester. It is my policy to drop a student for Quit Attending if they meet any of the following criteria:

• An overall percentage lower than 40% in the course

• No homework has been submitted for two weeks

• No Canvas login for more than two weeks

## Weather-Related Cancellations

Online, hybrid, and virtual classes: Online, hybrid, and virtual classes will continue as scheduled even if DMACC locations (campus, center, site, etc.) are cancelled. Only on-campus classes, labs, events, and 3rd party sites such as clinicals will be cancelled for weather-related closures.

Classes meeting on campus, at a center/site, or 3rd party location such as clinicals: Classes meeting on any campus, center/site, or a 3rd party location such as clinicals are cancelled when that campus, center, or site is closed due to weather. Online, hybrid, and virtual classes will continue when campuses, sites, or centers are closed due to weather.

## Grading Criteria

Based on the percentage of points possible accumulated throughout the course. Points will be awarded exams, quizzes, assignments, and participation.

A = 93 - 100%

A- = 90 - 92%

B+ = 87 - 89%

B = 83 - 86%

B- = 80 - 82%

C+ = 77 - 79%

C = 73 - 76%

C- = 70 - 72%

D+ = 67 - 69%

D = 63 - 66%

D- = 60 - 62%

F = 0 - 59%

## Classroom Conduct

For more details, please see https://www.dmacc.edu/handbook. In addition, show consideration for your classmates and me through these courtesies:

• Participate actively and respectfully in all student-to-student and student-to-faculty activities.

## Missed Exams

No makeup exams, quizzes, or projects will be given, except in cases of extreme circumstances to be determined by the instructor. A zero score will be awarded for missed exams, quizzes, or assignments. If an exam or quiz has a time limit, students who exceed the time limit will have two points deducted from their score for each minute beyond the time limit.

## Late Assignments

No late work will be accepted without extenuating circumstances and approval from the instructor.

## Extra Credit

Extra credit is awarded at the discretion of the instructor.

## Class Cancellation Procedure

I will use Canvas's Announcements to communicate the following: grading status, changes to homework assignments (i.e., due dates, add/remove action item), reminders, class cancellation, and general interest items.

## Academic Misconduct and Plagiarism

DMACC's Academic Misconduct Policy (ES4670) prohibits plagiarism; falsification; unauthorized collaboration during an exam, project, or assignment; or the misrepresentation of identity by a student or individual to complete an exam, course, or project. Plagiarism is defined as presenting someone else's work or ideas as your own by including it into your work without citing the original author's work. Academic Misconduct may be intentional or unintentional in nature. Academic Misconduct may result in sanctions for the student. Sanctions are issued based on the severity and nature of the misconduct. It is the student's responsibility to become familiar with and follow DMACC's Academic Misconduct procedure at https://dmacc.link/ES4670.

## Support Services / Accommodations

Services for Students with Disabilities: https://www.dmacc.edu/disabilities
Any student with a documented disability who requires reasonable accommodation should contact the Disability Services Coordinator at 515-964-6850 or the counseling & advising office on any campus to apply for services.

## Nondiscrimination Statement

Des Moines Area Community College shall not engage in nor allow discrimination covered by law against any person, group or organization. This includes in its programs, activities, employment practices, or hiring practices, and harassment or discrimination based on race, color, national origin, creed, religion, sex, sexual orientation, gender identity, age, disability, genetic information (in employment) and actual or potential parental, family or marital status. Veteran status in educational programs, activities, employment practices, or admission procedures is also included to the extent covered by law.

Individuals who believe they have been discriminated against may file a complaint through the College Discrimination Complaint Procedure. Complaint forms may be obtained from the Campus Provost's office, the Academic Deans' office, the Judicial Officer, or the EEO/AA Officer, Human Resources. ADA questions and concerns may be directed to the Section 504/ADA Coordinator at 2006 S. Ankeny Blvd, Bldg. 6, Ankeny, IA 50023, phone 515/964-6857, dso@dmacc.edu. Title IX questions and concerns may be directed to the Title IX Coordinator at 2006 S. Ankeny Blvd., Bldg. 1, Ankeny, IA 50023, phone 515/964-6216, Title9@dmacc.edu. Questions or complaints about this policy may be directed to the Director of the Office for Civil Rights, U.S. Department of Education, John C. Kluczynski Federal Building, 230 S. Dearborn St., 37th Floor, Chicago, IL

60604-7204, phone 312/730-1560, fax 312/730-1576, TDD 800-877-8339, email OCR.Chicago@ed.gov.

### Non-Discrimination Procedure Information:

Students who wish additional information or assistance may refer to Student Services procedure ES 4645 Discrimination and Harassment Complaint procedure located at https://dmacc.link/ES4645.

### Diversity, Equity, and Inclusion Information:

DMACC supports diversity, equity, and inclusion in all aspects of college and community life. The Director of Diversity Equity Inclusion may be contacted at 515 964-6299 or newittstruck@dmacc.edu.

### ADA/Section 504 Information:

The Academic Support Services Director is the official Student Accommodation Officer/Section 504/ADA Coordinator for DMACC. The ADA Coordinator's office is located in Bldg. 6-10E on the Ankeny Campus and may be contacted by voice (515-964-6857). The ADA Coordinator is responsible for ensuring that the college complies with federal regulations that guarantee qualified students with disabilities equal access to all programs and services. Any student, faculty, or staff member may contact the ADA Coordinator's office for clarification of federal regulations, appeal of a grievance, or resolution of a disability-related problem.

## Additional Information

DMACC's Student Support Request process connects students to available resources such as advising, counseling, tutoring and more. Faculty members may refer students through this process as a way to encourage connections to resources. Students are encouraged to respond to all DMACC phone calls or emails and take full advantage of available resources to support a positive college experience. More information may be found at studentsupportrequest.dmacc.edu.

To access additional information related to DMACC policies and procedures that impact the classroom (use of technology, weather-related cancellations, classroom conduct, etc.) please reference the myDMACC student portal.

If you do not have access to a computer and need a printed version of any of the information described above, contact your instructor.

Disclaimer: “This syllabus is representative of materials that will be covered in this class; it is not a contract between the student and the institution. It is subject to change without notice. Important: All students are strongly encouraged to visit the myDMACC portal to review policies and procedures. Any potential exceptions to stated policies and requirements will be addressed on an individual basis and only for reasons that meet specific requirements. If you have any problems related to this class, please feel free to discuss them with me.”

## Course Schedule

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| 1/21 | Install Qt | Assignment | 100 |
| 1/21 | Class Introductions | Discussion | 100 |
| 1/21 | Assignment Rules & APA Formatting Quiz | Quiz | 10 |
| 1/21 | Module 1 Zybooks Assignment | Assignment | 66 |
| 2/4 | Github submission | Assignment | 10 |
| 2/4 | Debugging with Error Messages | Assignment | 100 |
| 2/4 | Create a Program | Assignment | 100 |
| 2/4 | Module 2 Zybooks Assignment | Assignment | 79 |
| 2/4 | Debugging Assignment | Assignment | 15 |
| 2/11 | Salary Computation | Assignment | 100 |
| 2/11 | Currency Convertor | Assignment | 100 |
| 2/11 | Module 3 Zybooks Assignment | Assignment | 244 |
| 2/18 | Module 4 Zybooks Assignment | Assignment | 275 |

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| 2/18 | Software Sales | Assignment | 100 |
| 2/18 | Buggy Salary Calculator | Assignment | 100 |
| 2/18 | Module 4 Course Survey | Quiz | 0 |
| 2/25 | Buggy Guessing Game | Assignment | 100 |
| 2/25 | Module 5 Zybooks Assignment | Assignment | 193 |
| 2/25 | Savings Calculator | Assignment | 100 |
| 3/3 | Formatting Output | Assignment | 100 |
| 3/3 | File Input | Assignment | 100 |
| 3/3 | Module 6 Zybooks Assignment | Assignment | 158 |
| 3/10 | Module 7 Zybooks Assignment | Assignment | 172 |
| 3/10 | Return Value Function | Assignment | 100 |
| 3/10 | Overloading Functions | Assignment | 100 |
| 3/24 | Calendar Tool with Automated Testing | Assignment | 300 |
| 3/31 | Monkey Business: Two-Dimensional Array | Assignment | 100 |
| 3/31 | Module 9 Zybooks Assignment | Assignment | 167 |

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| 3/31 | Average Temperature: Vector | Assignment | 100 |
| 4/7 | Module 10 Zybooks Assignment | Assignment | 111 |
| 4/7 | Date using enum and struct | Assignment | 200 |
| 4/14 | The Factory | Assignment | 100 |
| 4/14 | Module 11 Zybooks Assignment | Assignment | 119 |
| 4/14 | Student Enrollment Tracker | Assignment | 100 |
| 4/21 | Derived Class Assignment | Assignment | 100 |
| 4/21 | Class Hierarchies Assignment | Assignment | 100 |
| 4/21 | Module 12 Zybooks Assignment | Assignment | 95 |
| 4/28 | Pass by Reference | Assignment | 100 |
| 4/28 | Pointer Assignment | Assignment | 100 |
| 4/28 | Final Project Proposal | Assignment | 20 |
| 4/28 | Current Events | Discussion | 0 |
| 4/28 | Module 13 Zybooks Assignment | Assignment | 68 |
| 5/2 | Module 14 Course Evaluation Survey | Quiz | 0 |
| 5/2 | Module 14 Zybooks Assignment | Assignment | 24 |

| Due Date | Assignment Name | Assignment Type | Points |
| --- | --- | --- | --- |
| 5/2 | Final Project | Assignment | 400 |
| | Module Discussion | Discussion | 0 |
| | Course Survey Extra Credit | Assignment | 0 |
| | Module 14 Course Evaluation Survey Extra Credit | Assignment | 0 |