



## Data Structures using C++

### CS 341 A1, Spring 2021

### Course Syllabus and Calendar

Course Format: Learning *from* Anywhere (LfA) using ZOOM thru Blackboard

Rev 0

**Instructor:** John S. Maslanka, Ph.D.

Wednesday Evenings, 1/25 – 5/5/2021, 6:00 PM – 8:45 PM,

email: [maslanka@bu.edu](mailto:maslanka@bu.edu)

Office hours: before or after class or by appointment

**Classroom:** ZOOM remote (NIP320)

except 4/21 (See Course Calendar)

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Home phone: 781-784-6232

Dr. Maslanka is a developer of computer language compilers, run-time library systems and system software utility programs. He retired in 2002 from the software development division of Hewlett Packard Company in Nashua, New Hampshire, as a Principal Software Engineer.

#### Course Description

The students are expected to gain an Object-Oriented understanding of the methodology of programming for Data Structures using the C++ Language. Topics include data abstraction, encapsulation, transportability, information hiding, and the use of recursion, also creation and manipulation of various data structures including searching and sorting algorithms, lists, stacks, queues, hashing, trees, and graphs. Programming procedures for accessing these structures are at the heart of understanding the subject matter of this course. The sessions of this course will be conducted using the **Learning from Anywhere** model, which has been developed by the Office of the BU Provost. Students will attend class in REMOTE mode, being online using ZOOM on their personal computers at another location of their choice which is conducive to class participation. Also, students are encouraged to assist in the development and enhancement of course materials.

#### Preliminary Expectations:

The student has successfully used an industrial programming language, such as C, C++, Basic, Fortran, SQL or a tool such as MS Excel to manage the processing of data. Also, the student is expected to be acquainted with the usage of a full-capability IDE such as MS Visual Studio, Oracle NetBeans, IBM Eclipse, MacOSX XCode or in the use of C++ in a UNIX or linux environment. A student who has no previous experience with the C or C++ languages, but who is fluent with other languages or data processing systems as mentioned above, is encouraged to attend the MET CS231 course. Homework assignments are to be completed on a platform such as Windows-7 or -10, or a UNIX or linux-based system or an Apple OS system, which supports the ANSI-15 Standard version of C++ or higher. The current standardized version of C++ is 17, which was ratified and published in 2017. All students are expected to participate in class discussions.

**Course Syllabus (continued)****Textual material:**

**Professor's Chapters and Programs on Blackboard.** (See Courseware below)

**References:**

- **Introduction to Programming in C++**, edition 1, by John Maslanka, publisher Kendall-Hunt, 2009, ISBN 978-0-75475-6465-7.
- **C++ How To Program**, 10th edition, by Harvey and Paul Deitel, Pearson, ISBN 978-0-13-4448237, 2014.
- **DATA STRUCTURES & Other Objects Using C++**, 4<sup>th</sup> edition, by Michael Main and Walter Savitch, Pearson Addison-Wesley, 2011, ISBN13: 978-0-13-212948-0.

**Courseware:**

Online **Blackboard** will be used in conjunction with this course. The CS341 Spring 2021 website on Blackboard will be self-enrolling and the student is expected to review its contents frequently.

**Course Policies**

**1) Attendance & Absences** – All students are expected to attend every class. Please inform me by email as soon as possible if you need to be absent from a class. Students are expected to make up all work from the missed class or classes including class notes, exams and homework assignments.

**2) Assignment Completion & Late Work** – All homework assignments are due on the dates specified in the attached course calendar. The Midterm exam will be a take-home exam and will be distributed in class and made available on Blackboard on the date specified in the course calendar. It will be due on the date specified in the calendar. The Final Exam will be given in class on the date during the Final Exam period of the semester, which is specified in the course calendar. All other course work and assignments must be completed and submitted prior to the Final Exam.

**3) Code of Academic Conduct** – Academic Integrity is required of all students. Please review the Student Academic Code of Conduct, which can be found at the following URL: [http://www.bu.edu/met/metropolitan\\_college\\_people/student/resources/conduct/code.html](http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/code.html). The Academic Code of Conduct should not be understood as a discouragement for discussing the course material or your particular approach to a problem solution with other students in the class or from forming and participating in study groups. On the contrary – you may share your thoughts, questions and solutions with your classmates. Nevertheless, if you choose to work in a group, you as the individual student will be expected to produce your own original solutions to homework and exam problems. Also, you will be expected to document by a citation the usage of any work by another person including the professor, other students, or any other widely available source, such as the internet or any hard-copy literature.

**Grading Policy:**

Midterm Exam: 25%, Final Exam 25%, Assigned Homework Problems: 50%. There will be five homework/lab assignments, for which the due dates are specified in the course calendar. Additional assignments will be made available on a per-request basis. The problem statements for these assignments will be approved by the Professor. The students will email their completed **source.cpp** and **source.h** files for their homework problem solutions, as well as solutions to the Midterm and Final Exams, to the professor at [maslanka@bu.edu](mailto:maslanka@bu.edu). All homework assignments and the Midterm should be emailed to the professor prior to 6:00PM on the due dates listed in the course calendar. The Final Exam will be “in class”. The exam document will be emailed to the students prior to 6:00PM on the day of the exam. The students are expected to email their solutions to the exam problems to the professor at [maslanka@bu.edu](mailto:maslanka@bu.edu) by 8:00 PM of that day.

**Boston University Metropolitan College**  
**Course Calendar Spring Semester 2021**

CS 341 A1

<b>Class Meeting Dates</b>	<b>Topics</b>	<b>Assignment Due Dates</b>
Jan 27	Course Introduction and Overview. Programmed Variables, Constants, Arrays, Addresses, Address Constants and Pointers	
Feb 3	Referencing, Dereferencing, Heap Memory and Dynamic Arrays Homework Statement 1 available.	
Feb 10	Sorting Algorithms: Iterative - Bubble, Selection Homework Statement 2 available	Homework 1 due in email by 6:00 PM
Feb 17	Sorting Algorithm: Recursive - Merge Sort. Program Efficiency and Big-O notation	
Feb 24	Review of elementary C++ classes and objects Homework Statement 3 available	Homework 2 due in email by 6:00 PM
Mar 3	Stacks and Singly Linked Lists using classes Singly Linked Lists using Container classes Discussion of <u>upcoming</u> Midterm Exam	
Mar 10	Doubly linked Lists, Queues; Hashing Midterm Take-home Exam available	Homework 3 due in email by 6:00 PM
Mar 17	C++ template classes, Standard Template Library Usage and Iterators	
Mar 24	Introduction to Trees, Building Binary Trees, Traversals and Searches Homework Statement 4 available	Midterm Exam due in email by 6:00 PM
Mar 31	Binary Trees -- AVL Reorganization	
Apr 7	Binary Trees -- Finish Reorganization, Binary Trees -- Deletions. Homework Statement 5 available	Homework 4 due in email at 6:00 PM
Apr 14	Introduction to Graphs / Networks – Creating Graphs, Breadth-First Traversals	
Apr 21	<u>No Class</u> – Monday Schedule on Wednesday (Patriots Day Holiday on Monday)	Homework 5 due in email at 6:00 PM
Apr 28	Graphs – Depth-First Traversals incl Dynamic Arrays; Review for Final Exam	Online MET Course Evaluations due
May 5	Final Exam 6:00 – 8:00 PM	Final due date for all outstanding work*

**\*Note:** All outstanding assignments are due to the Professor in email at [maslanka@bu.edu](mailto:maslanka@bu.edu) by 8:45PM on the evening of the Final Exam. Any gradables which are received after that time may not be graded. My final course grades are due to the Registrar by 5:00PM on the third day following the Final Exam.