



## **Data Structures with C++**

CS 341 C1, Spring 2017

Course Format: On Campus Face-to-Face

(Rev 0)

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

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Office hours: before class or by appointment

Department phone: 617-353-2566

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**Classroom:** TBD

### **Course Description**

The student is expected to gain an Object-Oriented understanding of the field of Data Structures using the C++ Programming Language. Topics include data abstraction, encapsulation, information hiding, and the use of recursion, also creation and manipulation of various data structures: lists, stacks, queues, trees, hashing, graphs, and searching and sorting algorithms. Programming methods for accessing these structures are at the heart of understanding the subject matter of this course. Students are encouraged to assist in the development and enhancement of course materials.

### **Preliminary Expectations:**

All students have successfully completed MET CS 231 or the equivalent in an academic or industrial environment. Also, all students are expected to be acquainted with the usage of a full-capability IDE such as MS Visual Studio, Oracle NetBeans, IBM Eclipse, MacOS XCode, etc.

Homework assignments are to be completed on a system such as Windows-7 or -10, or a UNIX or linux-based system or Apple OS system, which supports the ANSI-2010 Standard version of C++ or higher. The current version is C++11, ratified and published in 2013.

### **TextBooks:**

- **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.
- **The Professor's Source Programs, which will be distributed on Blackboard.**

### **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**, 9th ed., by Harvey and Paul Deitel, Pearson, ISBN 978-0-13-337871-9, 2014.

## Courseware:

Online **Blackboard** will be used in conjunction with this course. The CS341 Spring 2017 website will be self-enrolling and you are expected to review its contents several times per week.

## 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. The student is 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 takehome 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 due 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 date of the Final Exam.

**3) Academic Conduct Code** – Cheating and plagiarism will not be tolerated in any Metropolitan College course. Such actions will result in no credit for the assignment or examination and may lead to disciplinary actions. Please take time to review the Student Academic Conduct Code: [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 problem solutions with other students in the class or for 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.

## Grading Criteria:

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 request. Also, students may create problem statements for additional assignments which will be submitted to the Professor for approval. The students will email their completed **source**.cpp programs for the homework solutions, as well as Midterm and Final Exam, 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.

## Brief Biography:

Dr. Maslanka is a professional writer of computer language compilers and run-time systems. He is retired from Hewlett Packard Company/Compaq Computer Corporation/ Digital Equipment Corporation, having worked in their Marlboro, MA, and Nashua, NH, facilities from 1975 to 1984 and from 1991 until his retirement in 2002. Also, he has been Adjunct Faculty in the Boston University Metropolitan College Computer Science Department since 1973.

**Course Calendar Spring 2017 Rev 0: Class Meetings, Lecture Topics and Due Dates**

Date	Topic	Readings in Main & Savitch	Assignments due
Jan 25	Course Introduction, Overview of Course, Academic Integrity, C++ classes, Abstract Data Types	Ch 1, 2, 3 Appendices A-L	None
Feb 1	Pointers, References , Dereferencing, Dynamic Arrays; Recursion	Ch 4, 9	Homework 1 due in email by 6:00PM
Feb 8	Sorting Algorithms (Bubble and Merge) and Big-O Efficiency	Ch 13, 1	None
Feb 15	Container classes; C++ Templates and Template classes	Ch 3	Homework 2 due in email by 6:00PM
Feb 22	Linked Lists, Stacks	Ch 5	None
Mar 1	Software Development with the C++ -- Standard Template Library and Iterators	Ch 6, 14	Homework 3 due in email by 6:00PM
Mar 8		Ch 7-8, 12	None
Mar 15	Stacks, Queues, Hashing Discuss Midterm Exam	Ch 7-8, 12	None
Mar 22	Introduction to Trees, especially Binary Trees; Building Binary Trees; Traversals and Searches	Ch 10	Midterm take-home Exam distributed
Mar 29	Binary Trees – Balancing	Ch 11, 12	Midterm Exam due in email by 6:00PM
Apr 5	Binary Trees – Balancing (continued)	Ch 11, 12	None
Apr 12	Binary Trees – Removals	Ch 11	Homework 4 due in email at 6:00PM
Apr 19	No Classes – Patriots Day Holiday	None	None
Apr 26	Introduction to Graphs/Networks	Ch 15	None
May 3	Graphs – Traversals Overview for Final	Ch 15 All	Homework 5 due in email at 6:00PM
May 10	Final Exam in-class 6:00 – 9:00PM	All	Final due date for all outstanding assignments*

- **Note: All outstanding assignments are due to the professor in email by 6:00PM on the evening of the Final Exam. Any gradables which are received after that time will not be graded. My final course grades are due to the Registrar by 5:00PM, Friday, May 6.**