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**Contact:** Email is the best way to reach me. We can also chat briefly after class, but I ask that you please follow up by email to make sure that I don't forget details of the discussion and to make sure that I follow up with the right person. Also see **Office Hours**, **Drop-Ins**, and **Appointments** below.

**Office Hours:** Format and times depend on student input. This will be updated after the first week of class.

**Drop-Ins:** Drop-ins are in-person only and contingent on my schedule. I cannot guarantee that I will be in my office or available when you drop in. If you need me to be available at a specific time, then please make an appointment (see **Appointments** below).

**Appointments:** Appointments are preferred and can be arranged by email. These appointments can be in-person (251 Manchester Hall) or virtual (Zoom). In your email, please suggest a few meeting times, indicate meeting format (in-person or virtual), and, if you'd like, include any pertinent information about the appointment you're making.

# **1** Course Logistics

Section A: 12:30 - 1:45 PM (EST) Wednesdays and Fridays. Salem Hall 109.

Section B: 3:30 - 4:45 PM (EST) Wednesdays and Fridays. Manchester Hall 241.

**Learning Management System:** We will use Canvas in this class to track course logistics such as assignments and grades. Please bookmark and check our CSC201 Canvas page often so you don't miss any important announcements or dates.

**Textbook:** OpenDSA: Data Structures and Algorithms. This is a free, online textbook. The textbook will be supplemented with slides that I develop and other online resources that I will post or link to in Canvas.

## 2 Prerequisites

I expect that you have completed coursework equivalent to the WFU courses: CSC 111, CSC 112, and MST 117. I also expect that you are comfortable with (1) programming in Java, (2) recursion/recurrence relations, and (3) the ins and outs of linear data structures such as *arrays and linked lists*.

## **3** Introduction

CSC 201 is a 3 credit-hour course that is a study of fundamental data structures and the algorithms that act upon them. Data structure topics include the application, implementation, and complexity analysis of trees, hash tables, heaps, maps, sets, and graphs. Algorithmic topics include advanced sorting and searching methods and an introduction to divide-and-conquer and greedy techniques, graph algorithms, backtracking, and dynamic programming. CSC 201 is a prerequisite to numerous courses offered in this department and covers fundamental topics that will help you solve countless real-world problems.

## 4 Learning Objectives

At the end of the course, you will be able to:

- Analyze and prove the runtime efficiency of low- to medium-complexity algorithms, especially algorithms associated with data structures learned in this class.
- Understand the tradeoffs between various data structures.
- Chose the right data structure for a given problem and meet the problem's runtime/space requirements.
- Design and modify data structure operations such as insertion, deletion, search, and other related operations.
- Debug issues with data structure implementations by tracing through code and predicting actual behavior and actual output compared to expected behavior and expected output.
- Implement various data structures and algorithms discussed in this course in Java.

# 5 Course Load

| Component      | Weight |
|----------------|--------|
| Quizzes        | 10%    |
| Midterm Exam 1 | 15%    |
| Midterm Exam 2 | 15%    |
| Final Exam     | 20%    |
| Projects       | 40%    |

Table 1: Assessments and Weight

**Quizzes:** Some classes will end with quizzes to check your understanding of the course material as we progress through the lessons. Completing the assigned reading, following along with presentations, and practicing in class exercises are key to doing well. Quizzes are worth 10%.

**Midterm Exams:** There will be two in-class midterm exams on the dates shown in the **Course Calendar** below. Each midterm is worth 15% towards your final grade. The midterm exams will not be cumulative. Midterm 1 will cover material up until the date of the exam. Midterm 2 will cover material between Midterm 1 and the date of Midterm 2.

**Final Exam:** The final exam is <u>cumulative</u> and will cover all of the material studied in the class. The final is worth 20% towards your final grade.

**Projects:** Projects will be a mix of coding and problem solving assignments to help reinforce course content through hands-on practice. You are allowed to discuss the projects with other students, however, you project submission must be your own work and reflect your understanding and approach to solving the problems. Projects are worth 40%.

## 6 Grading

Your cumulative points will be converted to a letter grade according to the conversion in Table 2. The grade cutoffs will be strictly followed.

| А  | 93 and above | C  | 73 - 76.99 |
|----|--------------|----|------------|
| A- | 90 - 92.99   | C- | 70 - 72.99 |
| B+ | 87 - 89.99   | D+ | 67 - 69.99 |
| В  | 83 - 86.99   | D  | 63 - 66.99 |
| B- | 80 - 82.99   | D- | 60 - 63.99 |
| C+ | 77 - 79.99   | F  | below 60   |

Table 2: Points to Letter Grade Conversion

#### 7 Absences

Please provide documentation of University excused absences such as athletic or academic events within the first two weeks of the semester. Modified attendance accommodations must be approved in advance by the Center for Learning, Access, and Student Success (CLASS).

Please read the following resources from the Office of Academic Advising pertaining to Family and Medical Emergencies and Personal Emergencies and Hardships. Note that in these situations the instructor makes the final determination on appropriate accommodations and whether these absences are excused.

# 8 Use of Technology

You are welcome to use any technology you feel is essential to your learning, provided that such use does not distract others. Voice and/or video recordings of lectures, however, are not permitted unless these accommodations have been approved in advance by the Center for Learning, Access, and Student Success (CLASS).

**Exceptions:** Use of technology is **not allowed** during quizzes, midterms, and final exams unless these accommodations have prior approval from the Center for Learning, Access, and Student Success.

## 9 Inclusion

If you have concerns about accessibility and require accommodations for taking the course, then please email me and contact the Center for Learning, Access, and Student Success (CLASS) within the first two weeks of the semester. Retroactive accommodations will not be provided.

Preferred pronouns are not accessible through the class roster on WIN. If you feel comfortable, please share your preferred pronouns with me in-person or by email so that I use the appropriate pronouns.

#### 10 Code of Conduct

You are expected to treat course staff and fellow students with respect and follow the standards set by the Student Code of Conduct inside and outside the classroom. Violations of the code of conduct will be referred to the department chair and the Office of the Dean of Students.

#### **11** Academic Integrity

You may discuss programming and homework assignments with classmates. You may consult online resources to help you better understand the course material and help you do the assignments **provided that you cite your sources**. The assignments and code you submit **must be your own work product**. Copying assignments from your classmates or online resources is not allowed. Cases of plagiarism and academic misconduct will be referred to the department chair and dealt with through the WFU Honor System.

Please retain copies of your quizzes, midterms, and assignments until after final grades have been posted in case questions arise about authorship.

#### 12 Wake Forest University COVID-19 Protocols

Everyone is expected to follow the University's COVID-19 protocols described on the Our Way Forward website. Please note the policy update for Spring 2022 which requires:

- Proof of COVID-19 booster dose or an approved exemption.
- Mandatory face coverings indoors at the beginning of the semester.

#### 13 Campus Wellness

All of us share the responsibility of ensuring that the classroom and the campus as a whole is a safe and healthy learning environment. This is particularly true during the current pandemic. If you have concerns about the health and safety of another student, then please use the referral system and resources provided by the CARE Team which can connect the student with appropriate campus and community resources. Additional mental health and wellbeing resources can be found on the Our Way Forward website.

## 14 University Closures

The course will move to an online format using Zoom and Canvas, if university closures do not allow us to meet in-person. We will stay in contact by email and through Canvas to coordinate any course modifications that may be required.

#### **15** Important Dates

#### **15.1 Final Exam Schedule**

Section A: Monday, May 2th. 2pm - 5pm. Location TBD.

| Feb. 15th | Last day to drop                      |
|-----------|---------------------------------------|
| Mar. 9th  | No Class (Spring Break)               |
| Mar. 11th | No Class (Spring Break)               |
| Mar. 21st | Last day to drop with a grade of W    |
| Apr. 15th | No Class (Good Friday)                |
| Apr. 27th | Last day of class (Final Exam Review) |
|           |                                       |

Section B: Wednesday, May 4th. 2pm - 5pm. Location TBD.

Table 3: Important Dates

## 16 Course Calendar

| Week | Date      | Topic   | Textbook Sections   | Due |
|------|-----------|---|---------------------|-----|
| 1    | Jan. 12th | Introduction, Overview, and Review            | 8.1-8.3             |     |
| 1    | Jan. 14th | Algorithms Analysis I                         | 8.1-8.3             |     |
| 2    | Jan. 19th | Algorithms Analysis II                        | 8.1-8.3             |     |
| 2    | Jan. 21st | Algorithms Analysis III                       | 8.4                 |     |
| 3    | Jan. 26th | Algorithms Analysis IV                        | 8.6-8.8,8.11-8.12   |     |
| 3    | Jan. 28th | Algorithms Analysis V: Recurrences            | 6.6                 |     |
| 4    | Feb. 2nd  | Sorting Algorithms I: Intro                   | 13.1-13.3,13.5-13.6 |     |
| 4    | Feb. 4th  | Sorting Algorithms II: Recursive Algorithms   | 13.9-13.11          |     |
| 5    | Feb. 9th  | Exam 1 (Week 1 to 4)                          | -                   |     |
| 5    | Feb. 11th | Java Object-Oriented Programming              | 4.1-4.2             |     |
| 6    | Feb. 16th | Linear Data Structures I : Lists              | 9.1-9.3             |     |
| 6    | Feb. 18th | Linear Data Structures II: Lists              | 9.4-9.6             |     |
| 7    | Feb. 23rd | Linear Data Structures III: Stacks and Queues | 9.8-9.9,9.12-9.12   |     |
| 7    | Feb. 25th | Tree Data Structures I: Binary Tree           | 12.1-12.6,12.8      |     |
| 8    | Mar. 2nd  | Tree Data Structures II: Binary Search Tree   | 12.7,12.11-12.12    |     |
| 8    | Mar. 4th  | Tree Data Structures III: Heaps and Heapsort  | 12.17,13.12         |     |
| 9    | Mar. 9th  | No class (Spring Break)                       | -                   |     |
| 9    | Mar. 11th | No class (Spring Break)                       | -                   |     |
| 10   | Mar. 16th | Finish Tree Data Structures                   | TBD                 |     |
| 10   | Mar. 18th | Exam 2 (Week 6 - Week 10)                     | -                   |     |
| 11   | Mar. 23rd | Hash Tables                                   | TBD                 |     |
| 11   | Mar. 25th | Maps and Sets                                 | TBD                 |     |
| 12   | Mar. 30th | Graphs I                                      | TBD                 |     |
| 12   | Apr. 1st  | Graphs II                                     | TBD                 |     |
| 13   | Apr. 6th  | Graphs III                                    | TBD                 |     |
| 13   | Apr. 8th  | Backtracking Algorithms                       | TBD                 |     |
| 14   | Apr. 13th | Divide & Conquer and Greedy Techniques        | TBD                 |     |
| 14   | Apr. 15th | No class (Good Friday)                        | -                   |     |
| 15   | Apr. 20th | Dynamic Programming I                         | TBD                 |     |
| 15   | Apr. 22nd | Dynamic Programming II                        | TBD                 |     |
| 16   | Apr. 27th | Final Exam Review                             | -                   |     |