University of Oklahoma
Data Science and Analytics
DSA/CS 5005: Computing Structures
Course Syllabus
Summer 2016 – 5 credit hours
June 6 – August 12, 2016

Data Structures (DS) Instructor
Dr. Sridhar Radhakrishnan
Email: sridhar@ou.edu
Office Hours: Every Monday and Wednesday
      By Appointment – **Evenings Only**
      Via Google Hangout and Janux
      IM Chat

Discrete Mathematics (DM) Instructor
Dr. Sudarshan Dhall
Email: sdhall@ou.edu
Office Hours: Every Tuesday and Thursday
      By Appointment
      Via Google Hangout and Janux
      IM Chat

Learning Management System: https://janux.ou.edu

Course Meeting Time and Location
Fully online. See course schedule.

Course Prerequisite
For students enrolled in MS in DSA Program; all other students need special permission

Course Description
This course addresses discrete mathematics, object-oriented programming in C++, and data structures in C++. As part of the discrete mathematics students will be introduced to combinatorics, logic, relations, functions, computational complexity, automata, and graph theory. Students will be introduced to the fundamentals of object-oriented programming and learn to design, build, and analyze data structures using object-oriented principles and techniques.

Course Overview
This course is organized by week and is divided into two main sections: (1) Data Structures and (2) Discrete Mathematics. In addition to watching screencasts, reading texts and taking notes, you will have weekly homework assignments (DM), three programming projects (DS), a mid-term and a final exam.

Texts
1. For Data Structures (you will have to purchase this book)
Radhakrishnan, S., Wise L., and Sekharan, N. 2013. *Data Structures Featuring C++: A Programmer's Perspective.*

2. For Discrete Mathematics (this content is available for free on the Janux platform)
Doerr, A. and Levasseur, K. 2013. *Applied Discrete Mathematics.*

Materials

In order to get the most out of this course, you will need to make sure that you have the following hardware, software or web accounts:

• Webcam	• B Virtual Proctoring account
• Calculator	• Google + account for Google Hangout
• Wolfram CDF Player	• Adobe Acrobat PDF reader (latest version)
• Access to scanner or scanning App to PDF	• Updated browser
• C++ Compiler	

Expectations

This is a very intensive course delivered over a ten-week timeframe. You are expected to reserve AT LEAST three to four hours every day to watch the lectures, take notes, read the texts, do the self-checks, and complete the homework assignments and projects.

All assignments and exams must be uploaded in the Janux system by the due date and time stipulated in the platform. Ensure your familiarity with the Janux system in advance, and allot a sufficient amount of time for assignment submission and any technical difficulties that may arise.

If you need to reach either of us you can initiate a private IM Chat through the Janux platform or join us on Google Hangouts during our office hours. If you need to email us, please put "CS 5005-" in your subject line as a prefix. For example, your subject line could be "CS 5005 - Syllabus" or "CS 5005 - DS Project Question".

DM Homework

You will have weekly homework assignments for Discrete Mathematics. You may work out your homework assignments by hand with pen/pencil and paper. Submitting handwritten homework assignments will require the use of a scanner or smart phone-scanning app. Each device is hyperlinked.

- o Evernote Scannable (iOS)
- o Tiny Scan (Android & iOS)
- o Genius Scan (Android, iOS & Windows Phone)

There are tutorials for the scanning apps available on Lynda.com, which you can access for free. Just sign in with your OU 4x4 and password (http://www.lynda.com/Android-tutorials/Using-PDF-scanner-mobile-apps/183383/367929-4.html).

A specific naming convention is required for homework submissions, where X is the assignment number: **hwX_lastname_firstname.pdf.** Handwriting should be legible and easy to understand (e.g. not too small, not too light, not too dense, not too close to the margin). Be sure to clearly label each problem. The instructor should not have any difficulty in interpreting the problem being graded, solution techniques or answers due to a lack of organization or neatness. Further, the technology used to scan the submission (a scanner or scanning app for smart phone or tablet) should effectively provide legible results. Any confusion in interpreting the answer to a problem (whether the fault of the student or technology) will result in zero credit for that problem.

DS Programming Projects

Projects have to be coded in C++. Make sure that the C++ code you write and submit can be compiled using C++ complier. Microsoft provides a free version of the development environment (Visual Studio Express).

You can download this Express 2015 for Windows Desktop by clicking on the link https://www.visualstudio.com/en-US/products/visual-studio-express-vs. For mac users you can follow the link http://www.stroustrup.com/compilers.html. This provides access to several free compilers.

Your programming projects will be evaluated as follows:
1. For every 24 hours late, you will be deducted 10% of the grade of the programming project. Any project that is more than 5 days late will not be evaluated.
2. A programming project that does not meet the specifications will receive an automatic deduction 50% of the grade.
3. You are better off submitting a working project on the fifth day rather than one that does not on the day it is due.
4. Programs have to be documented clearly. Programs that lack sufficient documentation will receive a deduction of up to 30% of the grade. Follow the documentation methods that were used in programs presented in your data structures book.
5. The specification for the projects presented by the instructor may not contain all the details of implementation. It is your responsibility to understand the specifications thoroughly.
6. Copying programs or consulting others for coding is strictly prohibited.
7. Apart from the above general policies for evaluating, each programming project will also have a set of specifications that should be met.
8. All programming projects will be checked for plagiarism using an automated tool.

A specific naming convention will be required for Project submissions, where X is the project number: **hwX_lastname_firstname.**

Exams

The mid-term and final exams will cover materials from both DS and DM. Failure to take the final exam will result in an automatic "F" for the course. Exams will be open for a 12-hour window on the exam date. You have 90 minutes to complete the mid-term and 2 hours for the final.

Exams will be taken through the Janux platform. The proctoring service B Virtual will monitor your exam-taking activity via a webcam on your computer (required) in addition to monitoring your online and offline activity. Students must engage with B Virtual *prior* to taking the exam. Be sure to allot sufficient time to organize everything.

Once the exam is activated on Janux, students will have a limited amount of time to complete it. Please note the exam period INCLUDES the scanning and uploading of handwritten notes, so allow sufficient time to upload these documents to the Janux platform. The system will record the time a student retrieves the exam and when the exam is finally submitted, but the platform offers no timekeeping function for the student. As such, it is incumbent upon you to monitor your own examination pace and ensure that submission is on time.

Course Grading

The course letter grade will be assigned based on the overall percentage: 90-100 (A), 80-89 (B), 70-79 (C), 60-69 (D), and < 60 (F). The allocation of percentages is given below:

	Percentages
Discrete Math Homework Assignments	20%
Data Structures Projects	30%
Midterm Examination	25%
Final Examination	25%

Technical Support

If you need technical assistance, please contact OU IT by phone at 405-325-HELP or by email: **needhelp@ou.edu**.

You can also contact the Janux Support team for platform issues by emailing: janux@ou.edu.

Course Policies

Late Policy
Work submitted five days or more after the due date will NOT receive credit. You will earn 0 points for the assignment or exam.

Attendance
Since this is a fully online class. You are expected to view all lectures and complete all readings throughout the course.

University Policies

Academic Integrity
Cheating is strictly prohibited at the University of Oklahoma, because it devalues the degree you are working hard to get. As a member of the OU community it is your responsibility to protect your educational investment by knowing and following the rules. For specific definitions on what constitutes cheating, review the Student's Guide to Academic Integrity at http://integrity.ou.edu/students_guide.html.

To be successful in this class, all work on exams and quizzes must be yours and yours alone. If you become aware of a fellow student engaging in suspicious behavior, I encourage you to report it to us or directly to the Office of Academic Integrity Programs. That student is devaluing not only their degree, but yours, too. Be aware that it is our professional obligation to report academic misconduct, which we will not hesitate to do. Sanctions for academic misconduct can include expulsion from the University and an F in this course, so don't cheat. It's simply not worth it.

Religious Observance
It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

Reasonable Accommodation Policy
Students requiring academic accommodation should contact the Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information please see the Disability Resource Center website http://www.ou.edu/drc/home.html Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

Title IX Resources and Reporting Requirement
For any concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources, including advocates on call 24/7. To learn more or to report an incident, please contact the Sexual Misconduct Office at 405-325-2215 (8 to 5, M-F) or OU Advocates at 405-615-0013 (24/7). Also, please be advised that a professor/GA/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office. For more information, please see http://www.ou.edu/eoo.

Adjustments for Pregnancy/Childbirth Related Issues
Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact your professor or the Disability Resource Center at 405-325-3852 as soon as possible. Please see http://www.ou.edu/eoo/faqs/pregnancy-faqs.html for answers to commonly asked questions.

Tentative Schedule

Day	Type	Topic	Assigned	Due
June 6, 2016 (W1)	DS	Introductions; C++ Features		
June 7, 2016	DM	Chapter 1 Set Theory	**DM HW-1**	
June 8, 2016	DS	C++ Features		
June 9, 2016	DM	Chapter 1 Set Theory		
June 10, 2016	DS	C++ Features		
June 13, 2016 (W2)	DS	Chapter 1 Intro (Object-Oriented Programming)	**DS Project 1**	
June 14, 2016	DM	Chapter 2 Combinatorics	**DM HW-2**	**DM HW-1**
June 15, 2016	DS	Chapter 1 Intro (Object-Oriented Programming)		
June 16, 2016	DM	Chapter 2 Combinatorics		
June 17, 2016	DS	Chapter 1 Intro (Object-Oriented Programming)		
June 20, 2016 (W3)	DS	Chapter 2 Algorithms and Recursion		
June 21, 2016	DM	Chapter 3 Logic	**DM HW-3**	**DM HW-2**
June 22, 2016	DS	Chapter 2 Algorithms and Recursion		
June 23, 2016	DM	Chapter 3 Logic		
June 24, 2016	DS	Chapter 2 Algorithms and Recursion		
June 27, 2016 (W4)	DS	Chapter 3 Arrays, Strings, and Vectors	**DS Project 2**	**DS Project 1**
June 28, 2016	DM	Chapter 3 Logic	**DM HW-4**	**DM HW-3**
June 29, 2016	DS	Chapter 3 Arrays, Strings, and Vectors		
June 30, 2016	DM	Chapter 3 Logic; Chapter 4 More on Sets		
July 1, 2016	DS	Chapter 3 Arrays, Strings, and Vectors		
July 4, 2016 (W5)				
July 5, 2016	DM	Chapter 6 Relations and Graphs	**DM HW-5**	**DM HW-4**
July 6, 2016	DS	Chapter 4 Linked Lists		
July 7, 2016	DM	Chapter 6 Relations and Graphs		
July 8, 2016	DS	Chapter 4 Linked Lists;		
July 11, 2016 (W6)	DS	Chapter 5 Stacks and Queues		
July 12, 2016	DM	Chapter 7 Functions	**DM HW-6**	**DM HW-5**
July 13, 2016	DS	Chapter 5 Stacks and Queues		
July 14, 2016	DM	Chapter 7 Functions		
July 15, 2016	DS	Chapter 5 Stacks and Queues **Midterm Exam (DS/DM)**		**Midterm Exam**
July 18, 2016 (W7)	DS	Chapter 6 Single Dimensional Binary Trees	**DS Project 3**	**DS Project 2**
July 19, 2016	DM	Chapter 8 Recurrence and Recurrence Relations	**DM HW-7**	**DM HW-6**
July 20, 2016	DS	Chapter 6 Single Dimensional Binary Trees		
July 21, 2016	DM	Chapter 8 Recurrence and Recurrence Relations		
July 22, 2016	DS	Chapter 6 Single Dimensional Binary Trees		
July 25, 2016 (W8)	DS	Chapter 7 Self-Modifying Search Trees		
July 26, 2016	DM	Chapter 8 Recurrence and Recurrence Relations	**DM HW-8**	**DM HW-7**
July 27, 2016	DS	Chapter 7 Self-Modifying Search Trees		
July 28, 2016	DM	Chapter 8 Recurrence and Recurrence Relations		
July 29, 2016	DS	Chapter 7 Self-Modifying Search Trees		
August 1, 2016 (W9)	DS	Chapter 8 Priority Search Trees;		
August 2, 2016	DM	Chapter 9 Graph Theory	**DM HW-9**	**DM HW-8**
August 3, 2016	DS	Chapter 8 Priority Search Trees; Chapter 9 Sorting		
August 4, 2016	DM	Chapter 10 Trees		
August 5, 2016	DS	Chapter 9 Sorting		
August 8, 2016 (W10)	DS	Chapter 10 Hashing		**DS Project 3**
August 9, 2016	DM	Chapter 11 Algebraic Systems;		**DM HW-9**
August 10, 2016	DS	Chapter 10 Hashing; Chapter 11 Graphs		
August 11, 2016	DM	Chapter 11 Algebraic Systems		
August 12, 2016		**Final Examination (DS/DM)**		**Final Exam**