University of Nevada, Reno

CS 302: Data Structures

3 credits (Lecture 3 + Lab 0)

Fall 2013

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Instructor: Dr. Frederick C Harris, Jr.

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Teaching Assistant: Devyani Tanna

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- Office hours: TBA

Lectures:

- Monday, Wednesday: 9:30pm-10:45pm, AB 107

Labs:

- none

Important Notes and Dates:

- **Final Exam:** Friday December 14, 2011 2:45am – 4:45pm
- Holidays: M Sept 2(Labor Day); M Nov 11 (Veterans Day)

Required Textbooks:

- *Data Abstraction & Problem Solving with C++: Walls and Mirrors*, (6th edition) by Frank M Carrano and Timothy Henry, Pearson, 2013.
- *C++ Data Structures: A Laboratory Course,* (3rd edition) by Setfan Brandle, Jonathan Geisler, James Roberge, David Whittington; Jones and Bartlett, 2009.

Supplemental Books:

Course Description:

Catalog:

Data structures and algorithms fundamental to computer science; abstract data-type concepts; measures of program running time and time complexity; algorithm analysis and design techniques.

Prerequisites:

Courses:

- CS 202 (Computer Science II) with a C or better.

Topics:

- a good working knowledge of C++ programming up through recursion, dynamic memory and basic data structures such as stacks, queues, and linked lists.

Requirement or Elective:

- This course is required for the BS CSE Program.

Course Objective:

- Students will demonstrate an understanding of data structures, how to apply them in practical problems, and how to analyze their performance.

Course Outcomes:

The course outcomes are skills and abilities students should have acquired by the end of the course. These outcomes are defined in terms of the ABET Accreditation Criterion 3 Program Outcomes which are relevant to this course. All Criterion 3 Program Outcomes are listed in the next subsection and those relevant to this course are identified in the following table:

Student Outcomes	**Course Outcomes**	**Assessment Methods/Metrics**	**Program Educational Objectives Impacted**
3	Students demonstrate that they understand how to use appropriate data structures to solve a given problem.	Quizzes, Exams, Programming Assignments.	1,2,3
4	Students acquire an understanding of team dynamics by working in groups on programming assignments	Programming Assignments.	2,4
7	Students improve their communication skills by working in groups on the written part of the programming assignment report and giving a demo to the teaching assistant.	Project reports. Feedback from teaching assistant.	2,4
9	Students improve their ability to engage in continuing professional development and life-long learning.	Rush Hour Programming Assignments	4
10	Students will improve their knowledge of contemporary issues by working on programming assignments with a variety of applications	Final Exam Programming Assignments	4

Student Outcomes:

1. an ability to apply knowledge of computing, mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
3. an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints specific to the field.
4. an ability to function effectively on multi-disciplinary teams.
5. an ability to analyze a problem, and identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution.
6. an understanding of professional, ethical, legal, security and social issues and responsibilities.
7. an ability to communicate effectively with a range of audiences.
8. the broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society.
9. a recognition of the need for, and an ability to engage in continuing professional development and life-long learning.
10. a knowledge of contemporary issues.
11. an ability to use current techniques, skills, and tools necessary for computing and engineering practice.
12. an ability to apply mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
13. an ability to apply design and development principles in the construction of software systems or computer systems of varying complexity.

Program Educational Objectives:

Within 3 to 5 years of graduation our graduates will:

1. be employed as computer science or computer engineering professionals beyond entry level positions or be making satisfactory progress in graduate programs.
2. have peer-recognized expertise together with the ability to articulate that expertise as computer science or computer engineering professionals.
3. apply good analytic, design, and implementation skills required to formulate and solve computer science or computer engineering problems.
4. demonstrate that they can function, communicate, collaborate and continue to learn effectively as ethically and socially responsible computer science or computer engineering professionals.

Course Topics:

- Introduction, Principles of Programming and Software Engineering
- Recursion Intro
- Data Abstraction (ADTs)
- Linked Lists
- Recursion Problem Solving
- Algorithm Efficiency and Sorting
- Advanced C++ Topics (Templates, Inheritance, Friends, Binding)
- Trees
- Tables (Heaps, Hash, Maps) and Priority Queues
- Advanced Tables
- Graphs
- Tests
- Final Exam

Course Policies:

- Students are expected to attend, and be on time, for every class. This demonstrates professionalism and consideration for your fellow students and your Instructor. While the course does not have an attendance policy, students who miss class and/or are late for class may experience an impact on their grade by missing classroom activities and/or quizzes
- Students are expected to turn in all assigned materials in a timely manner.
- Students are expected to demonstrate professionalism and courtesy by either silencing or turning off all cell phones and/or other alarm or audible indicator devices

- The Instructors reserve the right to add to, and/or modify any of the above policies as needed to maintain an appropriate and effective educational atmosphere in the classroom and the laboratory. In the case that this occurs, all students will be notified in advance of implementation of the new and/or modified policy.

UNR Athletics:

- If you are involved with any ***university-sponsored*** athletic activities that will have an impact on your attendance, please provide your Instructor with a letter from your coach and/or the UNR Athletic Department as soon as possible, but no later than the end of the second week of classes. This should include the official schedule of your activities which will impact your attendance throughout the semester.

Assignments, Examinations and Grading:

- All Formal Homework Assignments (Including exercises and Projects) and all Exams (Quizzes, Hour Exams, and the Final) are to be treated as individual and not collective efforts, **unless specified otherwise**. A severe penalty will be given to any assignment which indicates collusion or cheating. The usual penalty for cheating on project or an exam is failure in the course.

Homework Assignments:

- There will be a number of Homework Assignments. These consist of practice questions which are intended to assist the student in mastering the course content. Some of these assignments will be collected and graded, but you will be informed in advance when an assignment is to be handed in

Quizzes:

- There will be several announced and unannounced quizzes in lecture.

Exams:

- There will be 3 Midterm Exams and a Final Exam. All exams will be closed books, closed notes.
- Permissions to take exams on other dates than scheduled will not be given, except for extreme medical emergencies.
- All exams will take place in the regular classroom.

Programming Assignments/Labs:

- The Programming Assignments/Labs require the solutions to problems using the computer. We will be using the workstations in the College of Engineering Computing Center (SEM 231). You will be instructed how to submit your projects for grading. Typically you will be asked to submit an electronic version of your code, and test runs, along with a folder with an appropriate write-up for your program.
- The electronic version of your lab is due at 6am on Wednesday of the week it is due (unless otherwise noted). Labs turned in after their due date and time will be graded as late. The penalty for late labs will be as follows:

When Lab is turned in	Penalty
By Thursday 6:00am (one day late)	20%
By Friday 6:00am (two days late)	40%
By Monday 6:00am (three days late)	60%
By Tuesday 6:00am (four days late)	70%
By One week late 6:00am	80%

- If a written portion of a lab is turned in late, it should be turned in to the Departmental Office. The secretary should stamp (with date and time) all labs submitted late, and then place them in the Instructor's mail box.
- A lab more than one week late will only receive a grade under special circumstances.
- **Note:** Every lab must be completed, working, and turned in. For each lab that is not, the final grade in the course may be lowered by 1/3 of a letter grade.

- The lab assignments should be considered as "open-book, take-home tests". If you need assistance with such an assignment, you may consult your professor, a CS TA designated to help CS 302, your textbook, or any other textbook. You may not receive substantive assistance in any form from any other source (i.e., from another student, from computer

center personnel, from paid or unpaid tutors, etc.). Any assistance you receive is to be documented in the comment section of your code.

- The only help you may receive from another student is with syntax errors or with questions regarding the computer system. Stealing another person's listing or having another person "ghost write" a lab will be considered cheating.

Late Submission Policy:

- Projects will be collected at the start of the class session in which they are due. A programming assignment turned in after collection is done will be graded as late.
- The penalty for late Homework will be as follows: max(10%,n^2%), where n is the number of school days. The penalty for late Programming Assignments/Labs was given earlier.

Grading Structure:

- The final grade will be based on (Tentative, subject to change):

Section	
Attendance/Participation/Homework	10%
Quizzes	10%
Programming Assignments/Labs	35%
Tests	30%
Final	15%

Important Notes:

- I will be using a +/- grading system.
- Every project must be completed, working, and turned in. For each project that is not, the final grade in the course may be lowered .
- You cannot earn a grad for the course higher than your Lab Average OR your final exam.

Academic Integrity:

Students are encouraged to study together, however each student must individually prepare his/her solutions. Cheating or plagiarism are not permitted and will be sanctioned according with the UNR policy on Academic Standards. You should carefully read the section on Academic Dishonesty found in the Policies section of the Office of Student Conduct. (copies of this section are on-line at http://www.unr.edu/student-conduct/policies/university-policies-and-guidelines/academic-standards/policy). Your continued enrollment in this course implies that you have read it, and that you subscribe to the principles stated therein.

Academic Success Services:

Your student fees cover usage of the Math Center (784-4433 or ***www.unr.edu/mathcenter/***), Tutoring Center (784-6801 or ***www.unr.edu/tutoring/***), and University Writing Center (784-6030 or ***www.unr.edu/writing_center***). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

Disability Statement:
If you have a disability for which you will need to request accommodations, please contact me or someone at the Disability Resource Center (Thompson Building, Suite 101), as soon as possible to arrange for appropriate accommodations.

Class Recording:
Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.