CSCE 221 "*Data Structures and Algorithms*"

Summer 2018

Instructor: Dr. Teresa Leyk
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Class Time and Place: MTWRF 8:00 am – 9:35 am, 113 HRBB
Office Hours: MTWR 11:25 am – 12:25 am, 317AA TEAG (other times by appointment)
Peer Teachers Office Hours, 129 HRBB | TAs office hours

Lab Time and Place:

CSCE 221-201	MTWR	10:00 am – 11:20 am	111C
CSCE 221-202	MTWR	12:30 pm – 1:50 pm	111C

Course webpage: All course information will be there.

Course Description: Credit 4. Specification, analysis and implementation of abstract data types for lists, stacks, queues, trees, hash tables, graphs, and their associated algorithms. Performance trade-offs of different implementations; asymptotic analysis of running time and memory usage. Includes the execution of students programs written in C++; emphasis on adherence to good software engineering principles.

Prerequisite/Co-requisite:

- CSCE 222 *"Discrete Structures*" or MATH 302 *"Discrete Mathematics"*
- CSCE 121 "I*ntroduction to Program Design and Concepts*"

Required Textbook: "*Data Structures and Algorithms in C++*" by M. Goodrich, R. Tamassia and D. Mount, 2011, Wiley, ISBN 13978-0-470-38327-8, the book cover.
Also, you may need a textbook on C++ language from the previous semester, or any good C++ reference book(s).

Learning Objectives:

1. Provide students with knowledge of basic abstract data types and associated algorithms for stacks, queues, lists, trees, graphs, hash tables, and priority queues.
2. Provide students with C++ programming practice by specifying and implementing data structures and algorithms.
3. Provide students with skills needed to understand and analyze complexity of algorithms focus on run time performance and memory usage.
4. Provide students with exposure to the latest events in Computer Science and Engineering and their impact on society or economy.

Expected Learning Outcomes: At the end of this course students should be able to:

1. Design and implement diverse data structures that allow easy access and manipulation of data using C++ programming language.
2. Apply the Big-O asymptotic notation to analyze and select an efficient algorithm for solving a given problem with respect to run time and memory usage.
3. Identify the latest developments in the Computer Science area or be familiar with Turing awards winners.

Course Content (the topics and related chapters from the textbook):

Introduction	
Vectors, Arrays, Linked Lists and Recursion	Chap. 6 & 3
Introduction to Analysis of Algorithms	Chap. 4
Sorting, Search and Selection	Chap. 11
Stacks, Queues, and Deques	Chap. 5
Trees and Search Trees	Chap. 7 & 10
Priority Queues. Heaps.	Chap. 8
Hash Tables, Maps, and Skip Lists	Chap. 9
Text Compression Algorithms	Chap. 12.4
Graphs	Chap. 13

Grading Criteria		**Grading Scale**	
Homework	15%		
Programming Assignments	20%	90–100	A
Final Project	6%	80–89	B
Culture Assignment	4%	70–79	C
Quizzes	10%	60–69	D
Exam I	15%	0–59	F
Exam II	15%		
Exam III	15%		

Use eCampus to get access to the lecture notes, submit your assignments, and check your grades during the semester.

Notes about Grading

- Your final grade will be determined based on written homework, programming assignments, cultural assignment, quizzes, exams, and the final project.
- The homework assignments will be announced in class and posted on eCampus. See the class calendar for deadlines.
- The written part of homework assignments or programming reports, and the Cover Page should be typed using LyX (document processor), see the class web page for a tutorial. The homework (LyX and PDF formats) should be submitted to eCampus.
- The programming assignments should be implemented in C++, compiled and run on a CS departmental computer (Linux machine), and transferred to eCampus.
- Each programming assignment will be graded focused on: algorithm design, usage of data structures and/or new user-defined types and their implementation, its correctness, testing, a typed report describing implemented algorithms and data structures, and results of computational experiments.
- A late homework assignment will be accepted **up to 2 week days with a 5% penalty for each late day**. Once solutions have been discussed or handed out, the assignments will not be accepted. Please discuss unusual circumstances in advance with the instructor.
- Culture assignments allow you to explore the latest developments in Computer Science and Engineering or learn about the famous computer scientists like Turing Award winners.
- Quizzes are over material covered during lectures and assigned reading from the textbook.
- 2 points will be added to your final score if you have perfect lab attendance, or 1 point if you have only one absence.

- **All grade appeals must be made no later than two weeks after the grade is posted.**

Additional Information

- **Learning process:** You may have noticed from the syllabus that this course focuses on obtaining a computer science background and developing programming skills. Programming is not something you can learn overnight by reading a textbook or lecture notes; it requires a lot of practice. The class TAs, PTs and the instructor are willing to help you learn and understand the course material, and help you master your programming skills so please see us during our office hours. A few hints about how to succeed in this course:
  - attend class and lab meetings regularly
  - use the online discussion board to ask questions and participate in discussions (you are responsible for posted information)
  - read lecture notes and related material in the textbook, and feel free to ask questions
  - study for quizzes and tests
  - retype and implement in C++ examples from the lecture notes and textbook
  - complete all labs and projects

  In general, Computer Science is not an easy subject but it will pay off after graduation.
- **Computer Science Account:** You need to have a CSE account in order to use any CSE computing resources: the labs, a Linux machine, printers, email, and web resources, see Getting Started Guide.
- **Attendance Policy:** The students class and lab attendance is required and is counted as part of the final grade, see the grading section above. The labs attendance will be taken on regular basis and the lecture attendance will be taken occasionally, but you are responsible to learn all material covered in class, read the assigned text from the textbook and do homework assignments. Make-up exams and quizzes will only be given with documented University-approved excuses, see University Regulations. Student Rule 7 explains attendance policies and excused absences.
- **There are no make-up quizzes or exams.** Please discuss unusual circumstances in advance with the instructor.
- **Scholastic Dishonesty:** Discussion of solutions is encouraged, but all assignments must be done on your own. If you use sources other than the textbook or lecture notes, list them in a homework cover page. Any homework or project, which in the opinion of the instructor shows evidence of copying, will receive a lower grade or even zero. See the latest issue of the "*Texas A&M University Student Rules*" under the section "*Scholastic Dishonesty*" posted on this website.
- **Copyrights**: The course materials used in this course are copyrighted. All handouts prepared for this class are copyrighted, which include syllabi, in-class exercises, lecture notes or slides, exams, quizzes, programming assignments, samples of code, homework, review sheets, problem sets, and solutions provided by the instructor. Because it is a copyrighted work, you do not have the rights to copy or distribute the course material, unless the author expressly grants permission.
- **Academic Integrity Statement and Policy:** "*An Aggie does not lie, cheat or steal, or tolerate those who do.*" See this link for the Honor Council Rules and Procedures: Aggie Honor.
- **Campus Emergencies or Code Maroon**: see Code Maroon .
- **Americans with Disabilities Act (ADA):** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Disability Services by calling 979-845-1637. For more information visit the disability services web page.