

**Texas Tech University**  
**Department of Computer Science**

**Course Name:** Data Structures

**Number:** CS2413

**Section:** 001

**Semester:** Summer I 2015

**Instructor Name:** Cong Pu

**Office:** 304 ENGCTR

**Email:** cong.pu@ttu.edu

**Office Hours:** 3:30pm-5:00pm (Th, Fr) or by appointment

**Class room:** 110 ENGCTR

**Class Hours:** 8:00am-9:50am (Mo, Tu, We, Th, Fr)

**Lab room:** 118 PETRE

**Lab Hours:** 12:00pm-1:50pm (Mo, Tu, We, Fr)

**TA:** Neda Tavakoli

**TA-Office:** 306-G ENGCTR

**TA-Email:** neda.tavakoli@ttu.edu

**TA-Office Hours:** 3:30pm-5:00pm (Mo, We)

**Catalogue Listing:**

Comparative study of the interaction of data and procedural abstractions. Data structures: lists, stacks, queues, trees, graphs. Algorithms: searching, sorting, hashing, graph traversals.

**Course Prerequisites:** CS1412 (Programming Principles II – C ).

**Text (required):**

*Data Structures Using C*, Reema Thareja. Oxford Higher Education, March 2011,  
ISBN-10: 0198065442, ISBN-13: 978-0198065449.

**Optional references (not required):**

Charles E. Leiserson, Clifford Stein, Thomas H. Cormen, and Ronald Rivest. Introduction to Algorithms, 3rd Edition, MIT University Press, Cambridge, 2009.

**Course objectives:**

The objective of this course is to enable students to solve problems using appropriate data structures, and to implement major data structures. This will be accomplished by:

1. Wisely choose data structures for a given application (a, j)
2. Implement data structures (such as stacks and trees) without using libraries (c)
3. Know the time and space complexity of basic operations on basic data structure (a, j)

**Key Topics:**

1. Abstract data types
2. Basic complexity analysis
3. Implementations of linear containers such as stacks, queues, and hashed arrays
4. Algorithms on linear containers: Sorting, searching , and hashing
5. Low level representations of trees and graphs
6. Graph traversals and tree search
7. Solving problems using proper data structures

**Learning Outcomes & Assessment Methods:**

Students who have completed this course should have the ability to:

Objective	ABET Outcomes	Assessment Methods
Wisely choose data structures for a given application	a, j	Quizzes, Assignments, Exams
Implement data structures such as linked lists, stacks, queues, trees without using libraries	c	Quizzes, Assignments, Exams
Know the time complexity of basic operations on basic data structures	a, j	Quizzes, Assignments, Exams

**Labs:**

Labs facilitate hands-on learning and critical and analytical thinking through individual and group work. During the lab sessions, students will be able to review lecture materials, discuss homework assignments for clarification, engage in critical thinking with real life problems. Students will be expected to identify the data structures and algorithms needed to solve the problems, devise solutions, and produce complete program.

### Grading Policy:

The final grade for this course will be based on labs, lab tests, lecture attendance, lab attendance, quizzes and exams, as described below:

- Lecture attendance: **10%**.
  - Each 1 point penalty will be given to each missing after the first two absences.
- Labs: **25%**.
  - Lab attendance: 20%, each 1 point penalty will be given to each missing after the first two absences.
  - Lab programming assignment: 80%
- Assignment: **10 %**
- Quizzes: **10 %**
  - The dates for quizzes will be announced before. There is no make-up for missing quiz.
- Lab tests: **15%**.
  - Lab programming test will be scheduled based on the progress.
- Exams: **30%**. (first exam: 15%, second exam: 15 %)
  - Students are required to **take exam on exam date**. There is no make-up for missing exam.
- Lab and assignment grading policy:
  - All assignments **MUST** be submitted to Blackboard. No submission to instructor by email. Late submission to TA by email with the permission from TA.
  - Compile error – receive 20% of total points.
  - Late submission – 30% of total points deduction **FIRST**, and then other grading policy apply.
  - Cheating – 0% of total points. All the work is finished **individually**. First time reported to instructor. Second time reported to department.
  - All code (functions, programs, etc.) must be submitted as instructed by TA.
  - Additional grading policy will be applied by TA or instructor.
  - The instructor or TA reserves the right to explain the confusing issues.
- The usual grading scale will be used:
  - A 90-100
  - B 80-89
  - C 70-79
  - D 60-69
  - F Below 60

**Ethical Conduct:** Although students are encouraged to discuss ideas and problems with the TA, instructor and other students, academic dishonesty will not be tolerated. **It is your responsibility to educate yourself about actions that constitute academic dishonesty.** If you are not sure whether a specific action is allowed, contact the instructor and/or the TA before you indulge in it! All submitted homework will be randomly checked for plagiarism. Academic dishonesty of any kind, if discovered, will result in a grade of 0 for the corresponding assignment. Any student who is caught indulging in academic dishonesty more than once will lead to a grade of “F” in the course, and further action according to the TTU operating procedures: <http://www.depts.ttu.edu/opmanual/OP34.12.pdf>

### **Classroom Civility:**

All violations of classroom civility will be reported to the Student Judicial Programs. The Texas Tech University Catalog states: “Students are expected to assist in maintaining a classroom environment that is conducive to learning.” In order to ensure that all students gain from time spent in class, **students are prohibited from engaging in any form of distraction**, e.g., reading newspapers (or other articles), working on other courses, and using cell-phones or laptops for calls or messages. If you indulge in any such inappropriate behavior (without explicit consent of the instructor), you will (at the very least) be asked to leave the classroom.

### **Student with Disabilities:**

Any student who, because of a disability, may require special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services Office in 335 West Hall or 806-742-2405.

**Course Schedule:** The table (below) provides the initial distribution of textbook chapters discussed over the lectures in the semester. **This schedule is tentative and subject to change.**

All changes will be announced in class or on the course website (Blackboard). Students are responsible for making sure they are informed about announcements.

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|-------------------|---------------------------------------|
| • June 02:        | Introduction and C review             |
| • June 03:        | C review                              |
| • June 04:        | Recursion                             |
| • June 05:        | Complexity Analysis                   |
| • June 08:        | Linked Lists                          |
| • June 09:        | Linked Lists and Stacks               |
| • June 10:        | Stacks                                |
| • June 11:        | Queues                                |
| • June 12:        | Queues                                |
| • June 15:        | Tree Introduction and Tree Operations |
| • June 16:        | Tree Operations                       |
| • <b>June 17:</b> | <b>First Exam</b>                     |
| • June 18:        | First Exam Solutions and Heap         |
| • June 19:        | Heap                                  |
| • June 22:        | Graph                                 |
| • June 23:        | Graph                                 |
| • June 24:        | Sorting                               |
| • June 25:        | Sorting                               |
| • June 26:        | Hashing                               |
| • June 29:        | Hashing and Data Compression          |
| • June 30:        | Review                                |
| • <b>July 01:</b> | <b>No Class</b>                       |
| • <b>July 02:</b> | <b>Second Exam 8:00 am – 10:30 am</b> |