

CSCI 2315: Data Structures

Spring 2015

Time: Tuesday/Thursday, 4:00 - 5:20 pm

Room: Bayou Building 3400

Instructor: Dr. Charles E. Phillips, Jr.

Office: Bayou Building 3128-8.

Phone: x3837

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URL: Under Construction

Office Hours: Tues/Thurs: 2:00 – 3:30pm; 5:30-6:30pm; and by appointment.

Teaching Assistant (TA): Sadruddin Jiwani **Email:** JiwaniS2010@UHCL.edu

Office Hours: To be Posted on Blackboard

Textbook

Mark Weiss. Data Structures & Problem Solving using Java, **4th Edition**. Addison Wesley. 2010. ISBN-10: 0321541405. ISBN-13: 978-0321541406.

Course Pre-requisite

CSCI 3133, CSCI 3134 or CSCI 1470, CSCI 1471. NOTE: JAVA is key

Grading and Evaluation

Participation	5%	(100points)
Assignments, ICE*, and Quizzes	40%	(800 points)
Midterm Exam	25%	(500 points)
Final exam	30%	(600 points)

* ICE – In Class Exercises

Grading Scale

90+ = A; 87-89 = A-; 84-86 = B+; 80-83= B; 77-79 = B-; 74-76 = C+;
70-73 = C; 67-69= C-; 64-66 = D+; 60-63 = D; 57-59 = D-; < 57 = F

Course Description

Course covers advanced programming techniques and data structures including arrays, linked lists, queues and stacks; abstract data types, recursion, searching and sorting, binary trees, hashing techniques, elementary algorithm design and analysis, and more.

Course Purpose

The purpose of this course is learn how to create more efficient computer algorithms to solve problems.

In order to meet this purpose, students must understand:

- A systematic approach to solving problems
- Java programming constructs (Reference Types, Programming with Objects, Recursion)
- How to evaluate performance (What is an Algorithm, Analyze/Calc. Performance, Big O)

- Basic data structures and types (Strings, Arrays, Linked Lists)
- How to build more complex data structures (Stacks, Queues, Trees, Graphs, Tables)
- Implementations of data structures (Searching, Sorting, Paths, Insertions, Deletions)

Course Goals

Upon successful completion of this class, students will be equipped with understanding how data structures can be utilized to enhance program performance and how they can be used to design elegant computer algorithms. Students will also be able to analyze computer algorithms (Big O), understand recursion, arrays, linked lists, stacks, queues, searching, sorting, graphs, hashing, binary trees, binary heaps, abstract data types and software development.

Learning Outcomes

After completing this class, students will be able to:

- Understand basic software engineering concepts such as design, implement, and test a solution when given a set of requirements.
- Recognize when and how to use the following data structures: arrays, linked lists, stacks, queues, and binary trees.
- Implement sequential searching, binary searching, and hashing algorithms.
- Apply various sorting algorithms including: Bubble, Insertion, Shell, Merge, and Quick sorts
- Understand recursion and be able to give examples of its use.
- Understand the complexity of algorithms (Big Oh notation)
- Understand implications of unethical conduct.

NOTE: This course will also focus on strengthening students' problem solving skills.

General Course Outline

1. Introduction to software development and the lifecycle. (Ch. 1)
2. Review of Java Programming (Ch. 1, 2, and 3)
3. Algorithm Analysis (Ch. 5)
4. Recursion. (Ch. 7)
5. Sorting (Ch. 8)
6. Arrays, ArrayLists and Linked Lists (Ch. 17)
7. Stacks and Queues (Ch. 16)
8. Midterm Exam Week
9. Spring Break. No School
10. Graphs and Paths (Ch. 14)
11. Trees (Ch. 18)
12. Binary Search Trees (Ch. 19)
13. Binary Heap (Ch. 21)
14. Hashing (Ch. 20)
15. Professional Ethics / Course Review and Exam Focus
16. Final Exam (Comprehensive)

Important dates:

Midterm:	Tuesday, 10 March and Thursday, 12 March 2015
Final:	4:00pm-6:50pm, Thursday, 7 May 2015

Other important dates: (You must confirm on the University Website)

20 January	First Class Day for Regular Session
19 January.....	University Holiday (MLK Day)
16-22 March	University Holiday (Spring Break)
4 February	Census Date SPR15
14 April	Last Day to Withdraw
5-11 May	Final Exams SPR 15 (Regular Session)

General Notes

- The Blackboard site will be the official site for this course.
- Must use UHCL-mail. Please note course (CSCI 2315) in Subject Line. Should check your mail at least once per day. Be respectful in email correspondence.
- Respect your TA. The TA is your first line of defense/offense.
- This is a face-to-face course conducted as lectures and presentations. The material will be posted on the course Blackboard. Students are expected to check Blackboard often.
- All submissions and deliverables of assignments are due on date given on Blackboard unless otherwise specified.
- Class attendance is expected. It is the student's responsibility to get the material discussed, announcements, handouts, or anything conducted during a missed class meeting.
- Participation in discussions with/from students is highly encouraged.
- All class assignments: 25% taken off per day penalty on late submissions for a maximum of two days. After the two days the assignment will not be accepted unless approved by instructor.
- Makeup of exams and assignments will be very restricted, and is allowed only under a legitimate, documented (appropriate documents) excuse that is to the discretion of the instructor.
- Students with special needs and disability should contact the instructor as soon as possible and contact Disability Services Office at 281-283-2627 website: www.uhcl.edu/disability
- **6 Drop Rule:** Students who entered college for the first time in Fall 2007 or later should be aware of the course drop limitation imposed by the Texas Legislature. Dropping this or any other course between the first day of class and the census date for the semester/session does not affect your 6 drop rule count. Dropping a course between the census date and the last day to drop a class for the semester/session will count as one of your 6 permitted drops. You should take this into consideration before dropping this or any other course. Visit www.uhcl.edu/records for more information on the 6 drop rule and the census date information for the semester/session.
- Academic Honesty: HONESTY CODE of UHCL states: **I will be honest in all my academic activities and will not tolerate dishonesty.** Students and Faculty are bound to the honor code; therefore, academic dishonesty will not be tolerated in this class! See the UHCL catalog for more details. You are encouraged to become familiar with the policy of academic dishonesty found in the UHCL official student handbook. All submissions are considered completely 100% your own work. Copying the work of others and allowing others to copy your own work is not acceptable and is considered academic dishonesty. Also, sharing the course material after finishing this course is not allowed. Any violation

of the dishonesty rules will result in filing *Academic Dishonesty Form* and subtracting 10% of total course grade for each incident and for all students involved in the incident.

Academic Honesty Code: see section 2.1.4 in the Students Life Policies handbook for the UHCL Academic Honesty Code:

http://prtl.uhcl.edu/portal/page/portal/PRV/FORMS_POLICY_PROCEDURES/STUDENT_POLICIES/Academic_Honesty_Policy .
