Computer Science Department

CPTG 244
Data Structures (4 units)
Spring Quarter, 2025

Time and Location
Lecture: 3/31/2025 – 6/12/2025, TR 1:00 p.m. – 2:50 p.m., PSC 147.
Lab: W 12:00 p.m. – 2:50 p.m., PSC 147.

Textbook: Data Structures & Algorithms, M. Goodrich, R. Tamassia & D. Mount, John Wiley & Sons, Inc., 2nd Ed.

Instructor
Dr. Hwang. Office PSC 255. E-mail: ehwang@lasierra.edu. Office hours: most anytime by appointment either in person or online via Zoom.

Course Description
Bulletin Course Description: Basic data structures such as lists, stacks, queues, priority queues (heaps), binary search trees and hashing. Sorting algorithms. Three class periods, one three-hour laboratory per week.

Prerequisite: CPTG 122.

Student Learning Outcomes
The computer science curriculum at La Sierra University provides opportunities to reach various goals under the broad mission statement: "To Seek, To Know, To Serve." This upper division computer science course covers more advanced computer hardware architecture in order to understand computer performance and how to make the computer execute faster.

Achievement at this intermediate level will be specifically demonstrated through the following:

- Appropriate competency in the software component of Computer Science core content; (SLO 3)

Topics

Week 1
- C++ Overview (1 - 3)
- Classes. Constructors and Destructors (1.5.2). Memory Allocation (1.5.3).

- Inheritance and Polymorphism (2.2). Templates (2.3). Exceptions (2.4).
- Linked Lists (3.1 - 3.4)

Week 2
- Recursion (3.5)
- Timing and Analysis Functions (4.1)
- Big-Oh Analysis (4.2)

Week 3
- Stacks (5.1). Queues 5.2). Deques (5.3)
- Vectors (6.1). Lists (6.2). Sequences (6.3)

Midterm 1

Week 4
- Trees (7.1)
- Tree Traversal (7.2)
- Binary Trees (7.3)

Week 5
- Priority Queues (8.1, 8.2)
- Heaps (8.3)
- Heap-Sort (8.3.5)

Week 6
- Maps (9.1)
- Hash Tables (9.2)
- Ordered Maps (9.3)
- Dictionaries (9.5)

Midterm 2

Week 7
- Binary Search Trees (10.1)
- AVL Trees (10.2)

Week 8
- Merge-Sort (11.1)
- Quick-Sort (11.2)
- Sets and Union (11.4)

Week 9
- Graphs (13.1, 13.2)
- Graph Traversals (13.3)
- Directed Graphs (13.4)

Week 10
- Shortest Paths (13.5)
- Minimum Spanning Trees (13.6)

Requirements and Evaluation

Tests
2 Midterms: Monday April 21 and Tuesday May 13. Final: Thursday June 12, 2025, 11:00 a.m. – 1:00 p.m.

Homework assignments
There will be approximately one homework assignment every two weeks. These assignments must be turned in at the beginning of the class period on the given due date. Late assignments are not accepted unless you have a medical or emergency excuse.

Final Project
A final embedded systems project is due on the last day of class.

Attendance and Class Participation
This course will include much hands-on work and discussion on both hardware and software. Students are expected to be on-time for class and ready to actively engage the material. Proper class preparation, active participation in class, and thoughtful conversation on the topic being discussed are expected. Since so much of what we learn takes place in dialogue with each other, the presence of each student is valued and necessary at every class period. To be excused from a class, you must provide an official note documenting the reason(s) for your absence. It is still your responsibility to catch up on any material that you have missed.

Grading
Homework 20%, Final project 20%, Midterms 2 @ 20% each, Final 20%.

Grade Scale
The final grades will be based on the following scale:

95 – 100%	A
90 – 94.9%	A-
87 – 89.9%	B+
83 – 86.9%	B
80 – 82.9%	B-
77 – 79.9%	C+
73 – 76.9%	C
70 – 72.9%	C-
67 – 69.9%	D+
60 – 66.9%	D
0 – 59.9%	F

"Incomplete" grades are given only in extremely unusual circumstances. See *La Sierra University Undergraduate Bulletin* for the University's policy concerning required procedures and course completion.

Policy on Assistance for Physically and Learning Challenged Students
La Sierra University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. The Office of Disability Services located in the Learning Support and Testing Center coordinates all student requests for accommodation relating to special needs (physical, learning, or psychological). A student with such needs should contact the Office of Disability Services the first week of the quarter by calling 785-2450. After proper documentation is established, instructor will meet with the student privately to discuss specific needs.

La Sierra University's Policy on Academic Integrity and Honesty
"Academic honesty is the cornerstone of institutional integrity. Academic dishonesty, on the other hand, is a treat to the intellectual fabric of an academic community and is, perhaps, the most serious violation of trust that can occur in a community of scholars and educators…. Students who commit any offense against academic integrity and honesty may receive from an instructor a failing grade in an assignment or a failing grade in a course, without possibility of withdrawal. The nature of the offense may dictate probation, suspension, dismissal, or permanent expulsion as determined by the dean and the Administrative Committee of the student's school of enrollment" (*La Sierra University Undergraduate Bulletin*).

Faculty members are expected to report all incidents of academic dishonesty. The instructor for this course will follow the established protocol for faculty members, which includes a report to the Provost's office should such an incident occur.

To be sure that you have no misunderstandings about the definitions of academic honesty or academic dishonesty, refer to your *La Sierra University Student Handbook*. The University has significant penalties for academic dishonesty, so please take this suggestion seriously.

La Sierra University's Policy on Sexual Misconduct (Title IX)
La Sierra University is committed to fostering an environment in which all members of our campus community are safe, secure, and free from sexual misconduct in any form. When learning of conduct or behavior that may not meet the standards outlined in the University's Sexual Misconduct policy, all faculty and staff are expected take an active role in upholding this policy and promoting the inherent dignity of all individuals. If members of our campus community, including students, have questions related to sexual misconduct or wish to report sexual misconduct in any form, please contact the Title IX Coordinator at (951) 785-2849 or titleix@lasierra.edu. La Sierra University's Sexual Misconduct Policy can be located online at https://lasierra.edu/fileadmin/documents/sexual-misconduct/title-IX-policy.pdf