

## CSCE 350 - Data Structures and Algorithms

- **Credit Hours:** 3 hours
- **Contact Hours:** 3 lecture hours
- **Instructor:** Drs. Yan Tong and Jason O’Kane
- **Required Textbooks:** Anany V. Levitin, *Introduction to the Design and Analysis of Algorithms*, Third Edition, Addison Wesley, Boston, MA, 2011.
- **Bulletin Description:** Techniques for representing and processing information, including the use of lists, trees, and graphs; analysis of algorithms; sorting, searching, and hashing techniques.
- **Prerequisites:** CSCE 240; MATH 174 or MATH 374 or MATH 574
- **Required Course** in CE, CIS, and CS
- **Course Outcomes:** Students will be able to:
  1. Describe formal analysis measures.
  2. Describe the relevance of abstraction to problem solving.
  3. Analyze and use lists, trees, and graphs.
  4. Apply common algorithm design techniques such as brute force, divide-and-conquer, decrease-and-conquer, transform-and-conquer, dynamic programming, and the greedy technique.
  5. Analyze algorithms.
  6. Use appropriate data structures

- **Student Outcomes addressed by course**

Program	Student Outcomes Addressed
Computer Engineering	1, 2
Computer Information Systems	1, 2
Computer Science	1, 2

- **Topics covered**

1. Structured programming, stacks, queues, lists (3 hours)
2. Determining the Running Time of Programs, Order of Magnitude Analysis (6 hours)
3. Brute force (3 hours)
4. Divide-and-Conquer (4 hours)
5. Dynamic Programming (6 hours)
6. Transform-and-Conquer (4 hours)
7. The Greedy Technique (3 hours)
8. Decrease-and-Conquer (3 hours)
9. Graphs (3 hours)
10. Reviews and exams (4 hours)