

## **INFSCI 2591: Algorithm Design**

### **Fall 2018**

In this course the student will be familiarized with fundamentals of algorithm design, programming from algorithms, advanced data structures, time complexity of algorithms, greedy algorithms, divide-and-conquer algorithms, dynamic programming, heuristics and approximation algorithms, and parallel algorithms.

**Objectives:** The objectives of students taking this course are to learn: (a) how to design different types of algorithms; (b) the different approaches in designing algorithms; (c) how to compare different algorithms for implementing the same problem; (d) advanced data structures; and (d) how to estimate the time complexity of an algorithm both theoretically and experimentally.

**Class:** Tuesday 12:00 – 2:50 pm, SIS Building, Room 403

**Instructor:** Hassan Karimi ([hkarimi@pitt.edu](mailto:hkarimi@pitt.edu))

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**Office:** Room 410, SIS Building

**Office Hours:** Monday 10:00 am – 12:00 pm; Thursday 3:00 pm – 6:00 pm

#### **Grading:**

Class projects	20%
Projects	60%
Pop quizzes/mini projects	20%

#### **Textbook:**

Foundations of Algorithms. Richard E. Neapolitan. Fifth Edition. Jones & Bartlett Learning (2015). ISBN: 978-1-284-04919-0.

#### **Topics:**

Introduction

Chapter 1: Algorithms: Efficiency, Analysis, and Order

Chapter 2: Divide-and-Conquer

Chapter 3: Dynamic Programming

Chapter 4: The Greedy Approach

Chapter 5: Backtracking

Chapter 6: Branch-and-Bound

Chapter 7: Introduction to Computational Complexity: The Sorting Problem

Chapter 8: More Computational Complexity: The Searching Problem

Chapter 9: Computational Complexity and Intractability: An Introduction to the Theory of NP

Chapter 10: Genetic Algorithms and Genetic Programming

Chapter 11: Number-Theoretic Algorithms

Chapter 12: Introduction to Parallel Algorithms

**Special note:**

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 216 William Pitt Union, (412)648-7890/(412)383-7355 (TTY), as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.