

Computer Science & Engineering 423/823
Design and Analysis of Algorithms
Lecture 00 — Course Introduction

Stephen Scott
(Adapted from Vinodchandran N. Variyam)

sscott@cse.unl.edu

Administrivia

- ▶ Overrides, if needed, will be granted on a priority basis; if you need an override, see me after class
- ▶ Syllabus

Overview

- ▶ This course studies **design** and **analysis** of algorithms
 - ▶ **Design:** Methods used to create new algorithms to solve problems (e.g. greedy, dynamic programming, divide and conquer)
 - ▶ **Analysis:** Mathematical (as opposed to empirical) assessment of an algorithm's **correctness** and **efficiency**

Correctness and Efficiency

- ▶ **Correctness:** Does the algorithm do what it is supposed to do *on all inputs*?
 - ▶ Could be an infinite or exponential number of inputs, so cannot typically do this empirically
- ▶ **Efficiency:** Measuring the algorithm's **running time**
 - ▶ Count number of basic operations (e.g. number of comparisons in sorting)

Efficiency

- ▶ Typically focus on the **worst-case**, **asymptotic** performance
- ▶ E.g. an algorithm with an input of size n takes $O(n^2)$ time steps on *all* inputs
- ▶ Other analyses, such as **average case**, can be done but are not as common