

Department of Information Sciences and Technology

PhD in Information Technology

Algorithms Essentials PhD Qualifying Exam Study Guide

Primary Course:

AIT 512: Algorithms and Data Structures Essentials

Primary Textbook:

Algorithms, 4th Edition by Robert Sedgewick and Kevin Wayne

Topic	Description	Readings
Fundamentals of Algorithms	<ol style="list-style-type: none"> 1. Programming Model 2. Data Abstraction 3. Bags, Queues, and Stacks 4. Analysis of Algorithms 5. Union Find 	Chapter 1
Sorting	<ol style="list-style-type: none"> 1. Elementary Sorts 2. Mergesort 3. Quicksort 4. Priority Queues 5. Applications of sorting 	Chapter 2
Searching	<ol style="list-style-type: none"> 1. Elementary Symbol Tables 2. Binary Search Trees 3. Balanced Search Trees 4. Hash Tables 5. Application of Searching 	Chapter 3
Graphs	<ol style="list-style-type: none"> 1. Undirected Graphs 2. Directed Graphs 3. Minimum Spanning Trees 4. Shortest Paths 	Chapter 4
Strings	<ol style="list-style-type: none"> 1. String Sorts (LSD, MSD, 3way) 2. Tries 3. Substring Search 4. Regular Expressions 5. Data Compression 	Chapter 5

Advanced Topics	<ol style="list-style-type: none">1. Event-driven Simulations2. B-Trees3. Suffix Arrays4. Maxflow5. Reductions6. Intractability	Chapter 6
------------------------	--	-----------