**CS 3510: Advanced Algorithms/Data Structures**  
**Spring 2017 Schedule**

<table>
<thead>
<tr>
<th>Day</th>
<th>Topic</th>
<th>Reading</th>
<th>Work Due</th>
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<tbody>
<tr>
<td>Jan 10</td>
<td>Course introduction, algorithms, complexity</td>
<td>Ch 0</td>
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<tr>
<td>Jan 12</td>
<td>Experimental measurement of algorithms</td>
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<td>Chapter 0</td>
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<tr>
<td>Jan 16</td>
<td><em>Martin Luther King Jr. Day (no classes)</em></td>
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<tr>
<td>Jan 17</td>
<td>Arithmetic algorithms</td>
<td>Ch 1.1</td>
<td>Chapter 0</td>
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<tr>
<td>Jan 19</td>
<td>Modular arithmetic algorithms</td>
<td>Ch 1.2</td>
<td>Chapter 0</td>
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<tr>
<td>Jan 24</td>
<td>Modular arithmetic algorithms</td>
<td>Ch 1.2</td>
<td>Chapter 0</td>
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<tr>
<td>Jan 26</td>
<td>Primality algorithms</td>
<td>Ch 1.3</td>
<td>Chapter 1</td>
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<tr>
<td>Jan 31</td>
<td>RSA cryptography algorithms</td>
<td>Ch 1.4</td>
<td>Chapter 1</td>
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<tr>
<td>Feb 2</td>
<td>Divide and conquer, multiplication, Recurrence relations</td>
<td>Ch 2.1,2.2</td>
<td>Chapter 1</td>
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<td>Feb 7</td>
<td>Mergesort, selection</td>
<td>Ch 2.3,2.4</td>
<td>Chapter 1</td>
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<td>Feb 9</td>
<td>Matrix multiplication, Closest Pair</td>
<td>Ch 2.5,2</td>
<td>Chapter 1</td>
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<td>Feb 14</td>
<td>Graphs and representations</td>
<td>Ch 3.1</td>
<td>Chapter 2</td>
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<td>Feb 16</td>
<td>Depth first search and connectivity, Directed graph search</td>
<td>Ch 3.2,3.3</td>
<td>Chapter 2</td>
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<td>Feb 20</td>
<td><em>President’s Day Holiday (no classes)</em></td>
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<tr>
<td>Feb 21-26</td>
<td><strong>Examination I</strong></td>
<td>Ch 0,1,2</td>
<td>Examination I</td>
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<tr>
<td>Feb 21</td>
<td>Strongly connected components</td>
<td>Ch 3.4</td>
<td>Chapter 3</td>
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<tr>
<td>Feb 23</td>
<td>Paths, distances, breadth first search, Dijkstra’s algorithm for shortest paths</td>
<td>Ch 4.1-4.4</td>
<td>Chapter 3</td>
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<tr>
<td>Feb 28</td>
<td>Paths with negative edges, paths in DAGS</td>
<td>Ch 4.6,4.7</td>
<td>Chapter 3</td>
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<tr>
<td>Mar 2</td>
<td>Arrays vs. heaps for priority queues</td>
<td>Ch 4.5</td>
<td>Chapter 4</td>
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<td>Mar 7</td>
<td>Trees, minimum spanning trees, Cut property and Kruskal’s algorithm for MST</td>
<td>Ch 5.1</td>
<td>Chapter 4</td>
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<tr>
<td>Mar 9</td>
<td>Disjoint sets and amortized analysis</td>
<td>Ch 5.1</td>
<td>Chapter 5</td>
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<td>Mar 13-17</td>
<td><strong>Spring Break (no classes)</strong></td>
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<tr>
<td>Mar 21</td>
<td>Prim’s algorithm for MST, Huffman encoding</td>
<td>Ch 5.1,5.2</td>
<td>Chapter 5</td>
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<tr>
<td>Mar 23</td>
<td>SAT algorithm with horn formulas, Set cover</td>
<td>Ch 5.3,5.4</td>
<td>Chapter 5</td>
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<td>Mar 28</td>
<td>Shortest paths in DAGs (again), Longest increasing subsequence</td>
<td>Ch 6.1,6.2</td>
<td>Chapter 5</td>
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<tr>
<td>Mar 30</td>
<td>Quiz Review, Entropy and information theory</td>
<td>Ch 3.4,5</td>
<td>Chapter 5</td>
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<tr>
<td>Mar 29-Apr 4</td>
<td><strong>Examination II</strong></td>
<td>Ch 3.4,5</td>
<td>Examination II</td>
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<tr>
<td>Apr 4</td>
<td>Edit distance</td>
<td>Ch 6.3</td>
<td>Chapter 5</td>
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<td>Apr 6</td>
<td>Knapsack, Chain matrix multiplication</td>
<td>Ch 6.4,6.5</td>
<td>Chapter 5</td>
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<td>Apr 11</td>
<td>All pairs shortest paths</td>
<td>Ch 6.6</td>
<td>Chapter 6</td>
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<td>Apr 13</td>
<td>Traveling sales person, Practical programming with dynamic programming</td>
<td>Ch 6.6</td>
<td>Chapter 6</td>
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<td>Apr 18</td>
<td>Linear programming, Duality</td>
<td>Ch 7.1,7.4</td>
<td>Chapter 6</td>
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<td>Apr 20</td>
<td>Simplex, NP-complete problems and dealing with them</td>
<td>Ch 7.6,8,9</td>
<td>Chapter 7</td>
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<td>Date</td>
<td>Event</td>
<td>Chapter(s)</td>
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<tr>
<td>Apr 25</td>
<td>Review/Quiz</td>
<td>Ch 0-7</td>
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<td>Apr 27</td>
<td>Reading Day</td>
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<tr>
<td>May 2</td>
<td>Final Exam 10:30 am - 12:30 pm</td>
<td>Ch 0-7</td>
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Class announcements may modify schedule from that listed above.