<table>
<thead>
<tr>
<th>Dept Number</th>
<th>CS 330</th>
<th>Course Title</th>
<th>Introduction to the Design and Analysis of Algorithms</th>
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<tbody>
<tr>
<td>Semester Hours</td>
<td>3</td>
<td>Course Coordinator</td>
<td>Wen-Chi Hou</td>
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<tr>
<td>Catalog Description</td>
<td>A detailed treatment of the design, analysis, and complexity of algorithms, including greedy algorithms, divide and conquer, dynamic programming, and limitations of algorithms as problems get larger or more complex.</td>
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**Textbooks**


**References**


**Course Learning Outcomes**

- To understand the advance data structures in-depth.
- To learn the basic concepts of algorithm design.
- To learn how to determine complexity of algorithms.

**Assessment of the Contribution to Program Outcomes**

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<tr>
<th>Outcome</th>
<th>1</th>
<th>2</th>
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<tr>
<td>Assessed</td>
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**Prerequisites by Topic**

220 with a grade of C or better.
## Major Topics Covered in the Course

1. **Mathematical Foundation**: formal treatment of analysis and design of algorithms, growth of functions, summations, recurrences, recursive vs. iterative algorithms, worst case and average case analysis of algorithms, lower bounds {8 classes}
2. **Trees**: B-Trees and other balanced trees {8 classes}
3. **Hashing**: hash functions, collisions and resolutions {6 classes}
4. **Heaps**: implementations, applications, and variations {3 classes}
5. **Sorting**: variations of quick sort, merge sort, heap sort {4 classes}
6. **Graph algorithms**: DFS, BFS, topological sort, minimum spanning trees algorithm, and shortest path algorithm {3 classes}
7. **Advanced algorithm design techniques**: divide and conquer, greedy and backtracking {4 classes}
8. **Introduction to parallel algorithms** {4 classes}