Runtime Analysis

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| Operation | Vector | Hash Table | Binary Search Tree |
| Load Data | O(n) | O(n) | O(n log n) |
| Search Course | O(n) | O(1) avg | O(log n) |
| Print Sorted List | O(n log n) | O(n log n) | O(n) |

Advantages and Disadvantages:

Vector Advantages – Simple, contiguous storage, good for small data sets

Vector Disadvantages – Searching for a single thing is slow, performance isn’t great for large datasets, sorting required for ordered output

Hash Table Advantages – Fast searching, good for large datasets, good for dynamic data

Hash Table Disadvantages – Doesn’t stay in order, collisions degrade performance, higher memory overhead

Binary Search Tree Advantages – Maintains order, great for inserting and deleting

Binary Search Tree Disadvantages – More complex to implement, performance depends on balance, higher memory usage  
  
Recommendation:

I believe the Binary Search Tree would be the best option. For what is needed, which is printing the course lists in alphanumeric order, it is ideal because it is efficient with searching and has a sorted output. Although it is more intricate and complex to implement, the performance has the potential to be far better, faster, and more efficient than the other options.