

# COMPUTER SCIENCE, M.S.

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## Learning Outcomes

1. At the time of graduation a Master of Science/Engineering student should be able to describe the techniques and principles for the development of high performance computer systems.
2. At the time of graduation a Master of Science/Engineering student should be able to describe the details of extant computer architectures.
3. At the time of graduation a Master of Science/Engineering student should be able to quantitatively analyze aspects of computer architecture and draw conclusions about performance.
4. At the time of graduation a Master of Science/Engineering student should be able to use models of languages, such as regular expressions and context-free grammars, to develop parsers for specific languages and construct intermediate representations such as abstract syntax trees.
5. At the time of graduation a Master of Science/Engineering student should be able to decorate abstract syntax trees according to the scope and type rules of a language, and use the decorated tree to generate intermediate code.
6. At the time of graduation a Master of Science/Engineering student should be able to recognize optimizations that compilers apply to transform intermediate code into more efficient code.
7. At the time of graduation a Master of Science/Engineering student should be able to work with basic aspects of discrete math related to the analysis of algorithms and data structures, e.g., sums, probability, basic properties of trees and graphs, asymptotic analysis and amortized analysis.
8. At the time of graduation a Master of Science/Engineering student should be able to analyze the time and space resources used by complex algorithms.
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10. At the time of graduation a Master of Science/Engineering student should be able to use high-order principles of algorithm construction, e.g., divide-and-conquer, dynamic programming, greedy algorithms, graph algorithms.
11. At the time of graduation a Master of Science/Engineering student should be able to understand the concept of NP-completeness and be able to find simply polynomial reductions between decision problems.
12. At the time of graduation a Master of Science/Engineering student should be able to integrate components to form coherent well designed system.
13. At the time of graduation a Master of Science student should be able to independently explore a research topic.