COMP 2080 - Analysis of Algorithms

**Calendar Description**: Methods of analyzing the time and space requirements of algorithms. Average case and worst case analysis. Models of computation.

**Prerequisites**: COMP 2130 and COMP 2140

**Recommended**: STAT 1000 or STAT 1001 or STAT 2210

**This course is a prerequisite for**: COMP 3030, COMP 3170, and COMP 4310.

**Outline**

1) Introduction to analysis of algorithms and review (1 ½ weeks)
   - Includes review of logarithms, summations, and binomial theorem. Introduce concept of algorithm run-time analysis.
2) Asymptotic Notation (2 weeks)
   - Introduction to Big-Oh, Big-Omega, Big-Theta and their properties.
3) Introduction to greedy algorithms (1 ½ weeks)
   - Discussion of greedy algorithms and proof of correctness.
3) Recurrences (3 weeks)
   - Introduction to linear recurrences. This includes homogenous, non-homogenous recurrences, characteristic equation, change of variable, and the Master theorem.
4) Divide and conquer algorithms (2 weeks)
   - Introduce divide and conquer design technique, proof of correctness, and run-time analysis.
5) Dynamic Programming (2 weeks)
   - Introduce the dynamic programming technique, principle of optimality, and runtime analysis.
6) Review (1/2 week)