Computing Science Course Outlines

CMPT 307 - D100 Data Structures and Algorithms

Instructor(s): Valentine Kabanets

Calendar Objective/Description:
Analysis and design of data structures for lists, sets, trees, dictionaries, and priority queues. A selection of topics chosen from sorting, memory management, graphs and graph algorithms.

Instructor's Objectives:
The objective of this course is to introduce concepts and problem-solving techniques that are used in the design and analysis of efficient algorithms. This is done by studying various algorithms and data structures.

Prerequisites:
CMPT 225, MACM 201, MATH 151 (or MATH 150), and MATH 232 or 240.

Topics:
- The following topics may be included:
- Motivating example: the stable matching problem
- Greedy (graph) algorithms, BFS, DFS, Dijkstra's Kruskal's and Prim's
- Simple data structures: priority queues (with heaps) and union-find
- Divide and conquer algorithms ant their analysis: solving recursions
- Dynamic programing algorithms and their analysis
- Flow algorithms and matching
- Randomized algorithms
- NP-completeness
- More advanced data structures

Grading:
The course has a final examination (worth 40% of the total grade). There will be four homework assignments which won't be collected and graded. Instead, there will be four 50-min quizzes in class (worth 15% each).

Required Books:
Algorithm Design, J. Kleinberg, É. Tardos, Addison Wesley, 2006, 9780321295354

Reference Books:

Academic Honesty Statement:
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).