CMPT 225 - D100 Data Structures and Programming

**Instructor(s):** David Mitchell

SFU Burnaby

**Calendar Objective/Description:**
Introduction to a variety of practical and important data structures and methods for implementation and for experimental and analytical evaluation. Topics include: stacks, queues and lists; search trees; hash tables and algorithms; efficient sorting; object-oriented programming; time and space efficiency analysis; and experimental evaluation.

**Instructor’s Objectives:**
This course will explore ideas of data and program organization that can help in developing elegant and efficient solutions to complex tasks. The primary topics are abstract data types (ADTs) to help manage the complexity of programs, and data structures to support efficient algorithms. We will study the specification, analysis, implementation (in C++), experimental evaluation, and application of fundamental ADTs and data structures. We will also study fundamental searching and sorting algorithms.

**Prerequisites:**
(MACM 101 and ((CMPT 125 and 127), CMPT 129 or CMPT 135)) or (ENSC 251 and ENSC 252). Quantitative

**Topics:**
- Abstract data types (abstraction, encapsulation, information hiding).
- Data structures: arrays, lists, stacks, queues, trees, heaps, sets, hash tables, graphs.
- Algorithms: searching and sorting; correctness and efficiency.
- Programming: object-oriented programming for ADT re-use; efficient implementation.

**Grading:**
Assignment and lab activities (20%); midterm tests (40%); final exam (40%). Details will be provided in a course outline distributed in the first week of classes, which may supersede this grading scheme. Students must attain an overall passing grade on the programming portions of assignments in order to obtain a clear pass (C- or better).

Students must attain an overall passing grade on the weighted average of exams in the course in order to obtain a clear pass (C- or better).

**Required 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).