CMPT 409 - D100 Special Topics in Theoretical Computing Science

**Instructor(s):** Binay Bhattacharya

**Calendar Objective/Description:**
Current topics in theoretical computing science depending on faculty and student interest.

**Instructor's Objectives:**
This course deals with the developments of techniques and skills needed to solve contest problems such as those appear on the ACM ICPC, Codeforces and Topcoder. These skills are valuable to prepare you for other courses, contests, job interviews etc. This course will discuss how to think about algorithms in a critical way. Many of the problems in a contest require you to design a new algorithm, not just apply a classic one. The weekly class schedule involves lectures in the classrooms and CSIL labs. Details will be discussed in the class.

This course can be concurrently taken with CMPT307 by students with good academic standing. In this case, a waiver from the instructor is required.

**Prerequisites:**
CMPT 307.

**Topics:**
- Elementary data structures, string manipulations, sorting and searching,
- Enhancing your theoretical background: arithmetic, number theory, combinatorics
- Algorithm design techniques: Brute force, dynamic programming, data structures
- Graph theory: Classical graph theory problems, A* search, stable marriage problem, eulerian circuits
- Geometry: Convex hulls, plane sweep, Voronoi diagram
- Improving your coding ability: Language considerations, testing and debugging, know your defects

**Grading:**
Most of the course works involve writing programs to solve interesting contest problems and getting them evaluated using the online judges. The details will be discussed in the class.

**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).