

## **CSE 5311: Advanced Algorithms**

### **RESEARCH TOPICS**

Several research project topics are briefly described below. You are expected to select one of these topics for your project. However, in exceptional circumstances I am also willing to consider other proposals that you may have on your own, provided they have a very strong relation to the contents of this course. Once you have selected a topic, please make appointments with me and/or Arjun asap to discuss the requirements of your topic in more detail. You are encouraged to interact with me and Arjun during the course of the semester and discuss ideas to better your work.

**Team Size:** Max 2 members.

### **Final Research Presentation:**

Once the research project is completed, the following is expected of you:

1. A presentation of your research survey/findings in class. Please prepare the slides in advance and have them approved by Arjun and/or me beforehand. We shall put up the slides on the class webpage.
2. You should also hand in a completed project report, which is essentially a polished version of the status report. If you have a programming component, include your experimental results, e.g. charts of running time versus input size, etc.
3. If you have a programming component to your research project, please demonstrate your project to me and/or Arjun, in which you show the various features of your system, such as its correctness, efficiency, etc. You should be prepared to answer detailed questions on the system design and implementation during this demo. You should also turn in your code and associated documentation (e.g. README files) so that everything can be backed up for future reference. Email all the required documents to me (CC'ing Arjun) with "CSE5311-Project <Lastname>" in the subject line.

### **Research Topics**

1. Approximation Algorithms for the Traveling Salesman Problem
2. Randomized Algorithms and their applications to well-known NP-Problems
3. Dimensionality Reduction techniques with applications in Nearest Neighbor Search and Clustering
4. Graph Spanners and Geometric Spanners
5. Approximate Query Processing in Databases
6. Database Searching and Information Retrieval
7. Algorithms in Sensor Networks and/or Peer-to-Peer Networks.
8. Advanced algorithms for bipartite and generalized matchings