CS 6505 - Fall 2017
Computability and Algorithms

Syllabus

Course Description, List of Topics and Methods:

• Recurion I, Solving Recurrences, Divide and Conquer, Sorting/Searching, KSelect, fast integer multiplication.
• Recursion II, Dynamic Programming (recursion and memoization) and Applications.
• Graph Algorithms, DFS, Connectivity and Strong Connectivity, Shortest Paths, MST.
• Mincut-Maxflow, Ford-Fulkerson, Edmonds-Karp, Bipartite Matching.
• NP-completeness, Reductions, SAT, independent set, vertex cover, Hamilton Cycle, TSP.
• Intro to Approximation Algorithms for NP-complete problems (eg SAT, vertex cover, set cover, TSP.)
• Intro to Number Theoretic Algorithms.

Textbooks:

• Algorithms, by Dasgupta, Papadimitriou and V. Vazirani, MIT Press.
• Introduction to Algorithms, by Cormen, Leiserson, Rivest and Stein, McGraw-Hill.
• Algorithm Design, by Kleinberg and Tardos, Addison Wesley.

Lectures: MWF, 10:10-11:00 Molecular Sciences and Engr G011.

The material covered in each lecture, or small groups of lectures, together with readings/references and/or notes will be posted. It is very important to understand that lecture notes, readings, references and outlines DO NOT SUBSTITUTE ATTENDING CLASS!
Proper Attendance: Contribute to effective content delivery. Respect your fellow students and instructor. BE ON TIME !

Instructor: Milena Mihail, Associate Professor, School of CS, College of Computing.
Office Hours:: Wed 12:00-4:00, Klaus 2138.
Email: mihail@cc.gatech.edu All email concerning this class should have subject title CS6505.
Your professor welcomes technical and administrative questions and concerns, and particularly incites your comments (positive and negative) about the class, including new ideas, suggestions, pointers to related materials (such as books, papers, web sites etc), topics that interest you and you want to explore further (topics that you see no points why you should bother...) and so on.
Phones: Office 404-385-0617 (unreliable answering machine.)
Cell: 404-379-1460 (quickest and most reliable communication, *but please use only if absolutely necessary..*

Teaching Assistant: TBA

Grading: • 15% Weekly homeworks, posted on Fridays and due one week later.
You may collaborate and/or read any resource online or offline in solving the problems.
However (1) you have to reference your working group and the used resources.
And (2) you must write your answers by yourselves, without any collaboration, and without using any resource, as if you are taking a closed book test.
Complete solutions will be posted shortly after the deadline.
Late homework policy: no credit for late homework, unless documented excuse.
Finally, please use your best handwriting when writing your solutions, or otherwise type them up.
We cannot guarantee that we will read and grade illegible or very tiny handwritings.
• $20\% \times 3 = 60\%$ Three inclass quizes.
Quiz 1 Wed Sept 27, Quiz 2 Wed Oct 25, Quiz 3 Mon Nov 30 (last day to drop class Fri Oct 27.)
• 25% Final Exam December 11 11:30-2:20

Prereqs: An undergraduate Algorithms class at the level of CS 3510 offered at Georgia Tech.