Randomized algorithms offer a new algorithmic methodology that has proven to be effective for designing efficient computer algorithms for a large class of problems of theoretical and practical importance. The new methodology often motivates new algorithmic ideas that lead to surprisingly simple and efficient algorithms for problems, including many ones that have been studied extensively based on traditional algorithmic methods.

This course gives an introduction to this new algorithmic technique. It assumes the familiarity of basic concepts of algorithms and complexity (e.g., materials covered in CSCE-311 or CSCE-411), and of elementary probability theory. Necessary concepts and techniques from probability theory and algorithm analysis will be reviewed. The main focus is a thorough discussion of the main paradigms, techniques, and tools in the design and analysis of randomized algorithms. Detailed analysis of numerous algorithms will illustrate the abstract concepts and techniques. You will learn about random walks, Markov chains, and the probabilistic method, etc.

We will not follow the textbook chapter and chapter. Instead, we will select proper materials from the textbook, starting with a brief review of the basic and necessary definitions. Supplementary lecture notes will be provided for materials not included in the textbook. There will be a number of homework assignments that help students to deepen their understanding on the lecture materials. The assignments are due on the designated due dates at the beginning of class. No late submissions will be accepted. Discuss unusual circumstances in advance with the instructor. There is also a course project in which students are given an opportunity to do research or study more advanced results in randomized algorithms.

There will be no midterm examination. The final examination is on Friday, May 6, 2016, from 1:00pm to 3:00pm.

Course Project:
Students have the following options to complete their course project:

- Doing a mini-research project on a new randomized algorithm for a selected problem;
- Reading a recent research paper and presenting it to the class;
- Implementing a nontrivial randomized algorithm for a problem and comparing it with a known deterministic algorithm for the problem.

Discuss your research project with the instructor before you start.

Textbook:

Rajeev Motwani and Prabhakar Raghavan,

Supplementary lecture notes will also be provided.

Grading: Homework 30%, Project 30%, and Final Examination 40%.

Remark. Course materials, lecture notes, and homework assignments can be found via the instructor’s home page: [http://faculty.cse.tamu.edu/chen](http://faculty.cse.tamu.edu/chen)

Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

Scholastic Dishonesty

As commonly defined, plagiarism consists of passing off as ones own the ideas, work, writings, etc., that belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of the person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules [http://studentrules.tamu.edu/rule20.htm](http://studentrules.tamu.edu/rule20.htm), under the section Academic Misconduct. Academic Integrity Statement “An Aggie does not lie, cheat, or steal or tolerate those who do.” Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor). On all course work, assignments, and examinations at Texas A&M University, the following Honor Pledge shall be preprinted and signed by the student: “On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work.”