TEXAS A&M UNIVERSITY   SYLLABUS

Course title and number	CSCE 440/640 Quantum Algorithms
Term	Fall 2012
Meeting times and location	MWF 10:20-11:10am, HRBB 126

Course Description and Prerequisites

This course gives a self-contained introduction to quantum algorithms, one of the most exciting recent developments in computer science. We do not expect any background knowledge in quantum computing nor in quantum physics. You should know how to multiply a matrix with a vector, but the most important prerequisite is simply an open mind.

Course Objectives

At the end of this course, students should understand the basics of the quantum circuit model, be able to understand fundamental quantum algorithms, and ways to protect quantum information.

Instructor Information

Name	Dr. Andreas Klappenecker
Telephone number	979 458 0608
Email address	klappi @ cse.tamu.edu
Office hours	M and T 2:00-3:00 or by appointment
Office location	HRBB 509B

Textbook and/or Resource Material

M. Nielsen and I. Chuang: Quantum Computation and Quantum Information, Cambridge University Press, 2000.

http://faculty.cs.tamu.edu/klappi/qalg-s11/qalg.html

Grading Policies

Midterm exam 25%, final project 30%, assignments 40%, culture 5%. The grades will be assigned on an absolute scale: A=90-100, B=80-89, C=70-79, D=60-69, F=0-59. I will lower the cut-offs if the grades are lower than expected.

Course Topics, Calendar of Activities, Major Assignment Dates

Date	Topic	
M Aug 27	Introduction	
W Aug 29	Background	
F Aug 31	Quantum Cryptography	
M Sep 3	Quantum Gates	
W Sep 5	Quantum Gates	
F Sep 7	Quantum Gates	
M Sep 10	Quantum Circuits	
W Sep 12	Quantum Circuits	
F Sep 14	Quantum Circuits	
M Sep 17	Quantum Search	
W Sep 19	Quantum Search	
F Sep 21	Quantum Search	
M Sep 24	Quantum Counting	
W Sep 26	Quantum Counting	
F Sep 28	Simon's Algorithm	
M Oct 1	Simon's Algorithm	
W Oct 3	Factoring	
F Oct 5	Factoring	
M Oct 8	Shor's Algorithm	
W Oct 10	Shor's Algorithm	
F Oct 12	Shor's Algorithm	

Date	Topic	

The midterm exam is on Friday, Oct 19. There will be a final project that can be done in teams (up to 2 persons for a theoretical topic, and up to 3 persons for a programming intensive project).

M Oct 15	Kitaev's Algorithm	
W Oct 17	Review	
F Oct 19	Midterm	

M Oct 22	Midterm exam solutions	
W Oct 24	Quantum communication	
F Oct 26	Quantum communication	
M Oct 29	Quantum communication	
W Oct 31	Quantum communication	
F Nov 2	Quantum communication	
M Nov 5	Quantum codes	
W Nov 7	Quantum codes	
F Nov 9	Quantum codes	
M Nov 12	Quantum codes	
W Nov 14	Quantum codes	
F Nov 16	Quantum codes	
M Nov 19	Fault Tolerance	
W Nov 21	Fault Tolerance	
F Nov 23	No class - Thanksgiving	
M Nov 19	Fault Tolerance	
W Nov 21	Project presentations	
F Nov 23	Project presentations	
M Nov 26	Project presentations	
W Nov 28	Project presentations	
F Nov 30	Project presentations	
M Dec 3 (A&M F Dec 3)	Project presentations	

Other Pertinent Information

The course webpage is
http://faculty.cs.tamu.edu/klappi/csce640-f12/index.html
You will find homework assignments. current class schedule, and other information on that page

Americans with Disabilities Act (ADA) Policy Statement

The following ADA Policy Statement (part of the Policy on Individual Disabling Conditions) was submitted to the University Curriculum Committee by the Department of Student Life. The policy statement was forwarded to the Faculty Senate for information.

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, the 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 the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.

Copyrights

The handouts used in this course are copyrighted. By "Handouts" we mean all materials generated for this class, which include but are not limited to syllabi, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy such handouts, unless the author expressly grants permission.

Scholastic Dishonesty

As commonly defined, plagiarism consists of passing off as one's 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://student-rules.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

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.**"