TEXAS A&M UNIVERSITY

SYLLABUS

Course title and number   CSCE 440/640 Quantum Algorithms
Term (e.g., Fall 200X)   Fall 2014
Meeting times and location   MWF 1:50-2:40pm, HRBB 113

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.

Instructor Information

Name   Dr. Andreas Klappenecker
Telephone number   979 458 0608
Email address   klappi @ cse.tamu.edu
Office hours   M 10:30-11:30am and T 10:30-11:30 or by appointment
Office location   HRBB 509B

Textbook and/or Resource Material

Required: Kaye, Laflamme, Mosca: Introduction to Quantum Computing, Oxford University Press, 2007.
Recommended: M. Nielsen and I. Chuang: Quantum Computation and Quantum Information, Cambridge University Press, 2000 (electronic copy at the library)
and the lecture notes on course webpage (see below)

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 Sep 01	Introduction	
W Sep 03	Quantum Key Exchange	
F Sep 05	Quantum Circuits Model	
M Sep 8	Quantum Gates	
W Sep 10	Quantum Gates	
F Sep 12	Quantum Gates	
M Sep 15	Quantum Circuits	
W Sep 17	Quantum Circuits	
F Sep 19	Quantum Circuits	
M Sep 22	Quantum Search	
W Sep 24	Quantum Search	
F Sep 26	Quantum Search	
M Sep 29	Quantum Counting	
W Oct 01	Quantum Counting	
F Oct 03	Simon's Algorithm	
M Oct 6	Simon's Algorithm	
W Oct 8	Shor's Algorithm	
F Oct 10	Shor's Algorithm	
M Oct 13	Review	
W Oct 15	Midterm	
F Oct 17	Midterm exam solutions	
M Oct 20	Kitaev's Algorithm	
W Oct 22	Quantum Walks	
F Oct 24	Quantum Walks	

M Oct 27	Quantum Walks	
W Oct 29	Quantum communication	
F Oct 31	Quantum communication	
M Nov 3	Quantum communication	
W Nov 5	Quantum communication	
F Nov 7	Quantum communication	
M Nov 10	Quantum codes	
W Nov 12	Quantum codes	
F Nov 14	Quantum codes	
M Nov 17	Quantum codes	
W Nov 19	Quantum codes	
F Nov 21	Quantum codes	
M Nov 24	Fault Tolerance	
W Nov 26	Fault Tolerance	
F Nov 28	Thanksgiving (no class)	
M Dec 01	Fault Tolerance	
W Dec 03	Project presentations	
F Dec 05	Project presentations	
M Dec 08 (Friday!)	Project presentations	
	Project presentations (TBD)	
T Dec 16 (3:30-5:30pm)	Project presentations	

The midterm exam is on Friday, Oct 15. There will be a final project that can be done in teams (2-3 students per project).

Other Pertinent Information

The course webpage is
http://faculty.cs.tamu.edu/klappi/csce640-f14/index.html
You will find homework assignments. current class schedule, and other information on that page.
Undergraduate students should enroll in CSCE 440, unless they intend to earn graduate credit.
Graduate students should enroll in CSCE 640, so that it can be used on a graduate degree plan.

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

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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.**"