$$|\Phi^+\rangle = \tfrac{1}{\sqrt{2}}(|00\rangle + |11\rangle)$$
$$|\Phi^-\rangle = \tfrac{1}{\sqrt{2}}(|00\rangle - |11\rangle)$$
$$|\Psi^+\rangle = \tfrac{1}{\sqrt{2}}(|01\rangle + |10\rangle)$$
$$|\Psi^-\rangle = \tfrac{1}{\sqrt{2}}(|01\rangle - |10\rangle)$$

MAT 5991

Introduction to Quantum Information

MAT 5991 Project Instructions. Dated August 28, 2014.

1 Learning Objectives

This project addresses the following learning objectives:

"By the end of this course, students will be able to

- select, summarize and defend an advanced topic in quantum information processing;
- relate and compare this topic with material in the course;"

2 Topic

You must chose an advanced topic in quantum information not covered in class. Usually this would consist in one or two research papers, or a section in a textbook. Possible topics are/will be posted online. You may want to take advantage of this project to learn about a particular topic of interest to you, but please choose a topic that does not significantly overlap with your research project, or with any other project you have or will submit for credit (if in doubt, consult me and/or your supervisor).

2.1 Deliverables

Your project will be evaluated on a number of deliverables:

1. One week before your presentation, you must electronically (via email or Blackboard) submit a one-page, typeset summary of your project. This should include your name, a title, a 2-paragraph abstract and the main references for your project. The abstract should consists in, roughly, one paragraph outlining the context of the project, and one paragraph outlining the main results or techniques, how they are achieved and their significance. You will be graded on the accuracy and conciseness of the abstract. **In this context, less is more!** Please note that this document will be posted on BlackBoard for your classmates to consult.

2. Also one week before your presentation, you must electronically (via email or Blackboard) submit four multiple choice questions (each question having 4 suggested answers; one of which is indicated as being correct) that relate to your project and whose correct answers should be straightforward to your classmates who will attend your talk. Please note that I may select some of your questions as evaluation questions for your classmates.

3. A 35-minute oral presentation delivered in class (30 minutes plus 5 minutes for discussion). Your oral presentation can be with audio-visual slides, or on the blackboard.

3 Presentation Dates

Presentation dates will be assigned on a first-come, first-serve basis when you confirm your topic with me (topics can be changed if no other student has reserved that topic). Tentative dates are November 28th and December 2nd, 2014.

4 Evaluation

One-page summary		
Content	states context, accurate and clearly gives main results or techniques clearly gives main idea and the methods to achieve them,	10
References	accurate, complete	5
General	neat presentation; appropriate use of mathematics and natural language	5
Multiple-choice questions		
	well-chosen and accurate	5
Oral Presentation		
Introduction	sets context, states problem, explains significance	10
Body	Organization, clarity, understanding of content, selection of material, relation to class content	30
Conclusion	State summary, outlook, relate to context	5
Discussion	displays understanding, answers clearly	5
Overall	appropriate amount of material, addresses audience, interest/enthusiasm, duration	10
		85