

# COURSE DETAIL

## QUANTUM INFORMATION AND COMPUTATION

**Country**

Hong Kong

**Host Institution**

University of Hong Kong

**Program(s)**

University of Hong Kong

**UCEAP Course Level**

Upper Division

**UCEAP Subject Area(s)**

Computer Science

**UCEAP Course Number**

132

**UCEAP Course Suffix****UCEAP Official Title**

QUANTUM INFORMATION AND COMPUTATION

**UCEAP Transcript Title**

QUANTUM INFO & COMP

**UCEAP Quarter Units**

5.00

**UCEAP Semester Units**

3.30

## Course Description

This course is an introduction to the interdisciplinary field of quantum information and computation. It covers the basic rules of quantum theory and the counterintuitive notions of quantum superposition and entanglement. In particular, it shows how quantum systems could be used to detect an object without directly interacting with it (Elitzur-Vaidman bomb tester), to increase the amount of bits that can be sent through a transmission line (dense coding), and to increase the chance to win certain games (CHSH game and GHZ game). It provides an overview of quantum computation and of major quantum algorithms such as Grover's search algorithm and Shor's factoring algorithm for prime factorization. Finally, the course introduces the upgraded framework of quantum theory, and uses it to explore applications to quantum error correction, quantum state discrimination, quantum cryptography, and quantum teleportation. Pre-requisite(s): MATH1013 or MATH1853 or MATH2014 or MATH2101.

## Language(s) of Instruction

English

## Host Institution Course Number

COMP3316

## Host Institution Course Title

QUANTUM INFORMATION AND COMPUTATION

## Host Institution Course Details

<https://www.cs.hku.hk/index.php/programmes/course-offered?infile=2025/comp3316...>

## Host Institution Campus

## Host Institution Faculty

## Host Institution Degree

## Host Institution Department

Computer Science

**Course Last Reviewed**

2025-2026

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