COURSE DETAIL

QUANTUM COMPUTING
Country Korea, South
Host Institution Yonsei University
Program(s) Yonsei University
UCEAP Course Level Graduate
UCEAP Subject Area(s) Computer Science
UCEAP Course Number 202
UCEAP Course Suffix
UCEAP Official Title QUANTUM COMPUTING
UCEAP Transcript Title QUANTUM COMPUTING
UCEAP Quarter Units 4.50
UCEAP Semester Units 3.00

Course Description

This course introduces quantum computing from a computer science perspective, focusing on mathematical and algorithmic foundations. Quantum computers have the potential to solve difficult computational problems for which no efficient classical algorithms exist. Writing quantum algorithms is radically different from programming classical computers and requires an understanding of quantum principles and the mathematical foundations behind them. Course participants will gain practical experience by developing quantum programs in Qiskit and their simulation and execution on quantum processing units(QPUs) of the IBM Quantum Platform, particularly the Yonsei University Eagle QPU.

Course goals: (1) Acquire a firm understanding of the quantum-mechanical foundations of qubit superposition, entanglement, and interference at the heart of all quantum computations. (2) Understand the early quantum algorithms such as Deutsch’s Problem, Bernstein-Vazirani, and Quantum FFT, and be able to code and execute them on a QPU. (3) Know recent near-term quantum algorithms like the quantum simulation of Hamiltonian dynamics. (4) Understand and control, in principle, the quantum circuit compilation pipeline and error mitigation techniques to execute near-term quantum workloads on QPUs.

Prerequisites: An introductory programming class, e.g., CAS1100-01, is strictly required. A course in linear algebra is strictly required.

Language(s) of Instruction
English

Host Institution Course Number
CSI7101

Host Institution Course Title
QUANTUM COMPUTING

Host Institution Course Details

Host Institution Campus

Host Institution Faculty
Host Institution Degree
Host Institution Department
Course Last Reviewed 2024-2025

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