

METU Department of Computer Engineering
CENG798 Quantum Computing
Fall 2026

Hours & Location: Friday 14:40-17:30
Blended (R-106 and link will be announced on ODTUClass)

Instructor: Murat Manguoğlu
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Prerequisites: Linear Algebra and Algorithms. A background in Physics is **not** required.

Books:

- Quantum Computing and Quantum Information, 10th Anniversary Edition Nielsen and Chuang, 2016
- Quantum Computing for Computer Scientists, Yanofsaky and Mannucci, 2008

Grading:

Project (midterm presentation)	%20
Project (final presentation)	%35
Project (final report)	%45

Projects will have three components: midterm presentation, final presentation and final report. We will post a project topic. The final report should be written using LaTeX. Midterm presentation should contain a proposed plan and preliminary list of references (around 7th week of the courses). The presentation (last week of the classes) should be done at level that is understandable by a person who has only a basic knowledge of quantum computing. After the presentation of your results, you will have time until the end of finals to finalize your report.

Coverage (Tentative):

- Introduction, history and motivation, basic operations with 1 qubit
- Review of linear algebra
- Multi qubit systems, bell states , and teleportation and superdense coding
- Quantum parallelism, Deutsch's, Deutsch-Jozsa and Simon's algorithms
- Quantum Fourier transform
- Quantum phase estimation and eigenvalue solver
- Quantum order finding
- Grover's search algorithm
- Common and alternative physical implementations of quantum computers, quantum noise and basic quantum error correction [if time permits]