Syllabus

INTRODUCTION TO QUANTUM COMPUTATION - 67596

Last update 19-10-2017

HU Credits: 4

Degree/Cycle: 2nd degree (Master)

Responsible Department: computer sciences

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof Michael Ben-Or

Coordinator Email: benor@cs.huji.ac.il

Coordinator Office Hours: By appointment (via email)

Teaching Staff:
Prof Michael Ben-Or
Course/Module description:
Introduction to Quantum Computation via Quantum Circuits; Basic Quantum Algorithms including Shor's Integer Factoring and Grover's Search algorithms; Lower bounds in the Quantum Query Model; Quantum Error Correcting Codes and Quantum Fault-Tolerant Computation; Quantum Key Distribution; Quantum Communication Complexity.

Course/Module aims:
The objectives of the course are to bring graduate students up to speed with the state of the art in quantum computation, and to prepare them to work on research problems in quantum computing.

Learning outcomes - On successful completion of this module, students should be able to:
Read research articles in Quantum Computation and work on research problems in Quantum Computation.

Attendance requirements(%):

Teaching arrangement and method of instruction:

Course/Module Content:
Introduction to Quantum Computation via Quantum Circuits; Basic Quantum Algorithms including Shor's Integer Factoring and Grover's Search algorithms; Lower bounds in the Quantum Query Model; Quantum Error Correcting Codes and Quantum Fault-Tolerant Computation; Quantum Key Distribution; Quantum Communication Complexity.

Required Reading:
Useful books for the course are Quantum Computation and Quantum Information, by Michael Nielsen and Ike Chuang; Classical and Quantum Computation by Kitaev, Shen, and Vyalyi; Quantum Computing Since Democritus by Aaronson; and Quantum Information Theory by Wilde.

Additional Reading Material:
**Course/Module evaluation:**
End of year written/oral examination 0 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 100 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

**Additional information:**