



PHYSICS OF QUANTUM COMPUTATION

Enrollment year	2015/2016
Academic year	2015/2016
Regulations	DM270
Academic discipline	FIS/03 (MATERIAL PHYSICS)
Department	DEPARTMENT OF PHYSICS
Course	
Curriculum	FISICA DELLA MATERIA
Year of study	1°
Period	2nd semester (01/03/2016 - 15/06/2016)
ECTS	6
Lesson hours	48 lesson hours
Language	ITALIAN
Activity type	ORAL TEST
Teacher	MACCHIAVELLO CHIARA (titolare) - 6 ECTS
Prerequisites	Basic notions of quantum physics, that will be recalled at the beginning of the course.
Learning outcomes	Learning of fundamental theoretical concepts related to the physics of quantum computation.
Course contents	<p>The course deals with the main developments in the theory of quantum computation and communications. The main topics are: Basic notions of the theory of computational complexity. Logic gates and networks. Quantum computation: single qubit gates and two-qubit gates. Universal quantum gates. Quantum algorithms: Deutsch, Deutsch-Jozsa, Simon, Grover, Shor. Introduction to the theory of quantum error correction. Superdense coding and quantum teleportation. Basic notions of classical cryptography and introduction to quantum cryptography. Introduction to entanglement theory. Separability criteria and techniques for distillation and detection of entanglement. Entanglement in quantum</p>

	algorithms. One-way quantum computation.
Teaching methods	=
Reccomended or required readings	I.L. Chuang and M.A. Nielsen, Quantum Information and Quantum Computation, Cambridge University Press (Cambridge UK 2000).
Assessment methods	Oral examination.
Further information	Oral examination.
Sustainable development goals - Agenda 2030	\$lbl legenda sviluppo sostenibile