KØBENHAVNS ERHVERVSAKADEMI

L37. Room: B220

KEA Datamatiker valgfag

Fall 2020

Introduction to Quantum Computing

Semester Plan

Week in year	Lecture	Topic	Syllabus	Activities
35 Aug 27	1	• Overview - Double slit experiment • Basic math	QCE 1 Check the exercises	Collaborative learning at Umesh Vazirani (L1.1-3) QCE 11-15 QCE 58,68 QCE 28-30,39 + Obligatorisk aflevering 1
36 Sep 3	2		RECAP/Reptition Question/Answers We will concentrate on Qiskit Installations QCE 2 (11-29) Check the exercises Decide and begin to create Your report of own choice	Collaborative learning at Umesh Vazirani (L2.1-4) Obligatorisk aflevering 2
37 Sep 10	3	• Systems of 2 Qubits • Polarization • Heisenbergs uncertainty principle QCE P68	○ QCE 2-3 ○ Check the exercises	Collaborative learning at Umesh Vazirani (L3.1-4) Obligatorisk aflevering 3

38 Sep 17	4	• Bell • Entanglement QCE-7 • CHSH	○ QCE 3-4-7 ○ Check the exercises	Collaborative learning at Umesh Vazirani (L4.1-4) Obligatorisk aflevering 4

39 Sep 24	5	• CHSH 1	QCE 4-5 Check the exercises	Obligatorisk aflevering 5
40 Oct 1	6	• CHSH 2	QCE 5-6 Check the exercises Deliver Mandatory report 1 - Topic of own choice	Obligatorisk aflevering 6
41 Oct 8	7	• Quantum Gates	QCE 8 Check the exercises	Collaborative learning at Umesh Vazirani (L5.1-4) Obligatorisk aflevering 7
42 Oct 15	8	• Quantum Teleportation	QCE 10 Check the exercises	Collaborative learning at Umesh Vazirani (L6.1-5) Obligatorisk aflevering 8
43 Oct 22	9	• Quantum Cirquits	QCE8 Check the exercises	Collaborative learning at Umesh Vazirani (L7.1-4) Obligatorisk aflevering 9

44 Oct 29	10	DTU Exercise Ulrich Busk Hoff Senior Adviser Operational leader of QuantumDTU Technical University of Denmark DTU Physics Fysikvej Building 307, Room 258 2800 Kgs. Lyngby	Lidt om omgivelserne på DTU http://www.quantum.dtu.dk/education/quantumlab	https://www.fysik.dtu.dk/-/media/Institutter/Fysik/Undervisning/Nanoteket/Vejledninger/QuantumLabBellsUlighed.ashx?la=da&hash=A9DC7FAC2652CFB20E50295F798B93FD96D9526B

45 Nov 5	11	• Early Quantum Algorithms	QCE 9 Check the exercises	Collaborative learning at Umesh Vazirani (L8.1-6) Obligatorisk aflevering 11 Her skal du aflevere kort rapport om de måledate du/I har arbejdet med på dagen – Fotokopier af papir materiale er helt OK
46 Nov 12	**12**	• Quantum Fourier transformations	QCE 9 Check the exercises	Collaborative learning at Umesh Vazirani (L9.1-5) Obligatorisk aflevering 12
47 Nov 19	13	• Quantum Factoring	QCE 9 Check the exercises	Collaborative learning at Umesh Vazirani (L10.1-3) Obligatorisk aflevering 13
48 Nov 26	14	• Quantum Search	QCE 9 Check the exercises	Collaborative learning at Umesh Vazirani (L11.1-3) Obligatorisk aflevering 14
49 Dec 3	15	• Quantum Cryptography •	QCE 11 Check the exercises	Obligatorisk aflevering 15

NB! Tilpasninger vil forekomme gennem semesteret

Literature ranked in order of importance

Need to have – Obligatorisk bog som jeg anbefaler at I køber men i vil også kunne finde den på fronter som PDF

1. David McMahon “*Quantum Computing Explained”[QCE]* ISBN: 978-0-470-09699-4

Nice to have som pdf nedenfor

2. Michael A. Nielsen & Isaac L. Chuang “*Quantum Computing and Quantum Information”[QCQI]* ISBN: 978-1-10700-217-3