SINGAPORE UNIVERSITY OF SOCIAL SCIENCES

Introduction to QTUM and underlying Technologies

If you are an entrepreneur who wants to learn more about the backbone technologies of blockchain or a software developer who aspires to build your own Dapps, this is the course for you. QTUM co-founder Patrick and several experienced QTUM developers will lead you through a series of courses that describe the backbone technologies, innovation and use cases of QTUM, a leading blockchain platform that combines the merits of both Bitcoin and Ethereum. You will also get hands-on experience building smart contract and creating your own Dapps.

The two-day workshop will begin with a general introduction to blockchain and QTUM from a business perspective. Then we will dive deeper into the underlying technologies of QTUM, including the UTXO model, Hash, cryptography, consensus and algorithm. After having an overall understanding of the underlying technology, we will teach you more about the specific code about QTUM and end day 1 with an introduction to the security issues related to blockchain in general.

Day 2 begins with an introduction to Solidity, EVM and QTUM's X86 Virtual machine, and followed by two hands-on coding sessions where attendees can learn to run qtumd with docker, transfer some funds, deploy a simple smart contract and interact with the contract via RPC. It will be followed by another exciting session where students can learn to deploy an ERC20 token contract. We will end the two-day workshop with another session on security and testing of QTUM.

This course emphasizes on the technology of blockchain. Attendees should have at least a basic understanding of Blockchain and preferably coding experiences. Attendees have to bring along their own laptops.

Objective

A. Knowledge and Understanding (Theory Component)

At the end of this course, participants should be able to:

- Describe the backbone technologies and use cases of QTUM
- Explain the security issues related to blockchain
- Understand how Solidity, EVM and QTUM's X86 Virtual Machine works

B. Key Skills (Practical Component)

At the end of this course, participants should be able to:

- Build and deploy smart contracts
- Create Dapps
- Deploy ERC20 token contract

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Topics

Time	Agenda
Day 1	
09:00 – 09:15	2-Day Course Overview by Patrick Dai
09:15 – 10:45	Part I - Overall Introduction to Blockchain and QTUM from Business Perspective: by Patrick Dai - Blockchain and underlying technologies - QTUM and its design philosophy - QTUM Dapps introduction - Overall challenges - Future impact
10:45 – 11:00	Break
11:00 – 12:30	Part II Tech basics of Blockchain and QTUM by Wenbin Zhong - Basic understanding of blockchain - UTXO, Cryptography, Consensus - QTUM and its Innovation - UTXO + EVM & X86 Virtual Machine - PoS - Decentralized governance protocol (DGP)
12:30 – 14:00	Lunch
14:00 – 15:30	Part III Breakdown of QTUM's technology by Wenbin Zhong - Qtum's Account Abstract Layer - Qtum's Mutualized PoS (MPoS) - Qtum's Decentralized Governance Protocol (DGP) - Future of smart contract: Qtum x86VM
15:30 – 15:45	Break
15:45 – 17:00	Part IV Security and testing on Qtum by David Jaenson - Blockchains and security - Examples of security vulnerabilities in blockchains
17:00 – 17:30	Assessment
Day 2	
09:00 – 09:15	Overview of the Day
09:15 – 10:45	Part V General Introduction on Solidity, EVM and X86 virtual Machine by David Jaenson - Smart contract language: Solidity - Virtual machines: EVM and X86
10:45 – 11:00	Break
11:00 – 12:30	Part VI Hands-on programming with QTUM by Howard Ye - Running qtumd with docker - Introduction to qtumd RPC, transfer some funds - Examine the underlying UTXO to see what's recorded on the ledger - Deploy a simple smart contract - Interact with the contract via RPC
12:30 – 14:00	Lunch
14:00 – 15:30	Part VII Hands-on programming: DApp & QTUMJS by Howard Ye - Deploy an ERC20 token contract - Holding a simple crowdsale - Using NodeJS script to interact with the deployed contracts

	- Running a GUI DApp for the ERC20 token
15:30 – 15:45	Break
15:45 – 17:00	Part VIII General introduction on the security and testing on Qtum by David Jaenson - Testing in qtum core - Smart contracts and security - Examples of security vulnerabilities in Solidity smart contracts - Common pitfalls
17:00 – 17:30	Assessment

Requirements

- Attendees should have at least a basic understanding of Blockchain, and should at least have entry level coding experience;
- Attendees have to bring along their own laptop

Duration: 2 days

Venue: Singapore University of Social Sciences (formerly known as SIM University)

Minimum number to run: 25 participants

Certificate of participation is awarded upon 75% attendance for the course

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Trainers' Profile

PATRICK DAI

Patrick graduated from Draper University and dropped out of his doctoral degree from the Chinese Academy of Sciences. Previously employed by Alibaba, and committed to the blockchain technology development, with abundant blockchain industry development experience.

WENBIN ZHONG

Wenbin Zhong graduated from Chinese Academy of Sciences, Masters of Information and Communication System. Wenbin has known Bitcoin since 2013 and has even mined cryptocurrency.

HOWARD YE

Howard is the author of "Deep Dive Into Ethereum Virtual Machine", a book dissecting the inner workings of Solidity and Ethereum. He is currently the Lead DApp Platform Engineer for QTUM, developing tools and libraries to create decentralized applications. Howard has 10 years of product and engineering experience in the startup world, and is passionate about building products that counter the centralizing tendencies of the old web.

DAVID JAENSON

David's interest in Bitcoin and blockchain tech started in 2013. He has previously worked on several startups and has interned at Nasdaq. He recently completed his master's thesis in distributed systems at Lund University.

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Course Fee

Self-sponsored/Company-sponsored					Company-sponsored
	International Participants	S'poreans and PRs (aged 21 and above)	SkillsFuture Mid-Career Enhanced Subsidy[1] (S'poreans aged 40 and above)	Workfare Training Support[2] (S'poreans aged 35 and above, and earn ≤ $2,000 per month)	Enhanced Training Support for SMEs[3]
Full course fee (A)	S$1100	S$1100	S$1100	S$1100	S$1100
SSG grant (70%) (B)	-	(S$770)	(S$770)	(S$770)	(S$770)
Nett course fee **(A) - (B) = (C)**	S$1100	S$330	S$330	S$330	S$330
7% GST on nett course fee **(D)**	S$77	S$23.10	S$23.10	S$23.10	S$23.10
Total nett course fee payable, including GST **(C) + (D) = (E)**	S$1177	S$353.10	S$353.10	S$353.10	S$353.10
Less additional funding if eligible under various schemes (F)	-	-	(S$220)	(S$275)	(S$220)
Total nett course fee payable, including GST, after additional funding from the various funding schemes (E) – (F) = (G)	**S$1177**	**S$353.10**	**S$133.10**	**S$78.10**	**S$133.10**

[1] Mid-Career Enhanced Subsidy
Singaporeans aged 40 and above may enjoy subsidies up to 90% of the course fees.

[2] Workfare Training Support
Singaporeans aged 35 and above (13 years and above for Persons With Disabilities) and earn not more than $2,000 per month, may enjoy subsidies up to 95% of the course fees.

[3] Enhanced Training Support for SMEs
SME-sponsored employees (Singaporean Citizens and PRs) aged 21 and above may enjoy subsidies up to 90% of the course fees.

- **Participants are required to achieve at least 75% attendance and/or sit and pass any prescribed examinations /assessments or submit any course/project work (if any) under the course requirement.**
- **The course fees are reviewed annually and may be revised. The University reserves the right to adjust the course fees without prior notice.**
- **Singapore University of Social Sciences reserves the right to amend and/or revise the above schedule without prior notice.**

For clarification, please contact the Centre for Continuing and Professional Education (CCPE) via the following:

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