Presidential Initiative for Artificial Intelligence and Computing (PIAIC)

https://www.piaic.org

Blockchain Specialist Program

Course Syllabus

Quarter I: BC-301 Blockchain Business Foundations

First Quarter 2019 (12 Weeks)

Teaching Team: Zeeshan Hanif, Qasim Shabbir Ferozpurwala, Muhammad Hammad Ahmed, Umair Munaf Moon, Muhammad Mudassir Khan, Mirza Fasihullah Baig, Muhammad Ali Raja, Yousuf Hanif, and Aaly Malik

Class Sections:
Sir Adamjee Institute of Management Sciences
Sunday 09:00 AM to 12:00 PM

Saylani Welfare Headoffice
Saturday 09:00 AM to 12:00 PM
Saturday 12:15 PM to 03:15 PM

Sindh Boy Scouts Association
Sunday 03:30 PM to 06:30 PM

Course Description: Many experts are predicting that blockchain will take over the world, and it will have a bigger impact on the world than the Internet. World wide over two billion people don't have access to financial services. They are outside the normal financial system and are considered unbanked people of this world. Most of these people live in the emerging countries like Pakistan. These unbanked don't have direct access to deposit accounts, credits, money transfers or insurance. Financial inclusion driven by blockchain, decentralized apps, and fintech will transform their lives by bring them out of poverty and helping them improve their lives. In the first quarter of this program we will cover general blockchain knowledge, why use blockchain, how blockchain works, and using the blockchain for business and financial inclusion. This course will prepare the student for the Pearson VUE Certified Blockchain Business Foundations Exam (CBBF).

Please bring a Laptop with you for the Classes (Required, but not mandatory)

Preparation for the Pearson VUE Certified Business Foundations (CBBF) exam:
Pearson VUE Certified Business Foundations (CBBF) exam

Textbooks:

1. CBBF Official Exam Study Guide
2. Mastering Bitcoin 2nd Edition - Programming the Open Blockchain by Andreas M. Antonopoulos
3. Mastering Ethereum: Building Smart Contracts and DApps by Andreas M. Antonopoulos, Gavin Wood
4. Building Ethereum Đapps: Decentralized Applications on the Ethereum Blockchain by Roberto Infante

PIAIC Announcements Facebook Group: https://www.facebook.com/groups/piaic/

Course Facebook Group: https://www.facebook.com/groups/cryptowitai.blockchain/

Android and iOS App for Class Attendance and Collaboration:
Esox AI by Mr. Asif Shah, Mr. Nasrullah Khan and Mr. Kamran Ali

Portal for online and onsite students:
https://portal.piaic.org/

Grading:
Students will be graded based on Percentile
https://en.wikipedia.org/wiki/Percentile
https://en.wikipedia.org/wiki/Percentile_rank

A-Grade: 78 - 99 Percentile
B-Grade: 41 - 77 Percentile
C-Grade: 23 - 40 Percentile
F-Grade: 1 - 22 Percentile
Anyone who is in the bottom 22th Percentile i.e. F Grade will deem to have failed and will not be promoted to the next quarter and will be removed from the program.

Note: Anyone absent from an exam will be deemed to have received a score of zero.

Course Outline:

1. **Fundamentals of Blockchain** (Week 1 to 5)
   Introduction:
   https://www.facebook.com/confidencenyirenda/videos/506908552980833/

   Demos:
   https://anders.com/blockchain/
   https://anders.com/blockchain/blockchain.html
   http://cobweb.cs.uga.edu/~dme/csci6300/Encryption/Crypto.html

   Chapters 1, 2, 3, 4, 5, 6, 7, and 8 from CBBF Official Exam Study Guide

   First two chapter of Mastering Bitcoin: Programming the Open Blockchain 2nd Edition

   Public and private keys:

   https://bitzuma.com/posts/six-things-bitcoin-users-should-know-about-private-keys/

   https://bitcoin.stackexchange.com/questions/43546/does-the-private-key-of-bitcoin-change-everytime-the-address-changes

   Hashing:
   https://www.webopedia.com/TERM/H/hashing.html

   Merkle Tree
   https://coincentral.com/merkle-tree-hashing-blockchain/

   Proof of work:
   https://keepingstock.net/explaining-blockchain-how-proof-of-work-enables-trustless-consensus-2abed27f0845

   Other Consensus Algorithms
   https://101blockchains.com/consensus-algorithms-blockchain/

   What is Double Spending & How Does Bitcoin Handle It?
   https://coinsutra.com/bitcoin-double-spending/

   Transactions:
   https://www.coindesk.com/information/how-do-bitcoin-transactions-work/

How Blocks are created?
https://dev.to/damcosset/blockchain-what-is-in-a-block-48jo
https://bitcoin.stackexchange.com/questions/8172/what-happens-if-two-miners-mine-the-next-block-at-the-same-time/8174

Bitcoin and Blockchain Quiz 1 in Week 4:
Total Questions: 102, Total Time: 150 minutes

2. **Blockchain 2.0 and Ethereum Part 1** (Week 6 and 7)

   Chapters 9 and 10 from CBBF Official Exam Study Guide

   What is Ethereum?
   https://github.com/ethereumbook/ethereumbook/blob/develop/01what-is.asciidoc

   Introduction
   https://github.com/ethereumbook/ethereumbook/blob/develop/02intro.asciidoc

   Object-Oriented Programming: Objects, Classes & Methods
   https://study.com/academy/lesson/oop-object-oriented-programming-objects-classes-interfaces.html

   What's the difference between a solidity contract and an OOP class?
   https://ethereum.stackexchange.com/questions/23789/whats-the-difference-between-a-solidity-contract-and-an-oop-class

   Ethereum and Blockchain Quiz 2 in Week 6:
   Total Questions: 20, Total Time: 30 minutes

3. **Blockchain 2.0 and Ethereum Part 2** (Week 8 and 9)

   Ethereum Client (Parity not covered)
   https://github.com/ethereumbook/ethereumbook/blob/develop/03clients.asciidoc

   Ethereum Testnets
   https://medium.com/compound-finance/the-beginners-guide-to-using-an-ethereum-test-network-95bbbc85fc1d

   Keys and Addresses (Just study the Introduction)
   https://github.com/ethereumbook/ethereumbook/blob/develop/04keys-addresses.asciidoc

   Wallets (only up to Wallet Best Practices)
   https://github.com/ethereumbook/ethereumbook/blob/develop/05wallets.asciidoc

   Transactions (Digital signatures section not included)
   https://github.com/ethereumbook/ethereumbook/blob/develop/06transactions.asciidoc

   Ethereum and Blockchain Quiz 3 in Week 8:
   Total Questions: 40, Total Time: 60 minutes

4. **Blockchain 2.0 and Ethereum Part 3** (Week 10)
   What is a Smart Contracts (till Building a smart contract with Solidity):
   https://github.com/ethereumbook/ethereumbook/blob/develop/07smart-contracts-solidity.asciidoc#what-is-a-smart-contract

   Why Many Smart Contract Use Cases Are Simply Impossible
   https://www.coindesk.com/three-smart-contract-misconceptions/

Deploying Smart Contracts
https://github.com/ethereumbook/ethereumbook/blob/develop/07smart-contracts-solidity.asciidoc

What are tokens?
How are tokens used?
Tokens and fungibility
Counterparty Risk
Tokens and intrinsicality
Using tokens: utility or equity
Token Standards (Just the very basics and a little bit of ERC20)
https://github.com/ethereumbook/ethereumbook/blob/develop/10tokens.asciidoc

Special Emphasis on Gas

Ethereum and Blockchain Quiz 4 in Week 10:
Total Questions: 30, Total Time: 45 minutes

5. **Private Blockchain Technologies** (Week 11)

An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends
https://www.researchgate.net/publication/318131748_An_Overview_of_Blockchain_Technology_Architecture_Consensus_and_Future_Trends

A gentle introduction to The Hyperledger Project
https://bitsonblocks.net/2016/12/09/a-gentle-introduction-to-the-hyperledger-project/

Hyperledger
https://en.wikipedia.org/wiki/Hyperledger

What's the Difference Between the 5 Hyperledger Blockchain Projects?
https://www.sdxcentral.com/articles/news/whats-the-difference-between-the-5-hyperledger-blockchain-projects/2017/09/

The top 5 enterprise blockchain platforms you need to know about
https://www.horsesforsources.com/top-5-blockchain-platforms_031618

https://blockgeeks.com/guides/different-smart-contract-platforms/

Blockchain Quiz 5 in Week 11:
Total Questions: 45, Total Time: 70 minutes

6. **Blockchain Use Cases and Verticals** (Week 12)
Chapters 11 and 12 from CBBF Official Exam Study Guide

Chapter 2 Summary, Chapter 3 from Building Ethereum ĐApps

Additional Reading:
Chapters 13 and 14 from CBBF Official Exam Study Guide

Blockchain Quiz 6 in Week 12:
Total Questions: 20, Total Time: 30 minutes