Module Outline
ECF on Fintech
Module 4 "Fundamental Fintech Tools and Applications"

Benchmarked HKQF Level:	5
No. of Credits:	20
Total Notional Learning Hours:	200
a) Class contact hours:	*21 hours (3-hour per session x 7)*
b) Self-study hours:	*176 hours*
c) Assessment hours:	*3 hours*
Pre-requisite:	N/A

Module Objective

The module aims to introduce the fundamentals of Machine Learning, Artificial Intelligence, and data analytics with hands-on Natural Language Processing (NLP) and deep learning applications using well-known tools; to introduce cloud computing concepts, services, underlying technologies, charges and budgeting, and provides hands-on experience on container deployment and orchestration to launch business applications; to introduce the concepts and applications of the Blockchain technology by covering major Blockchains solutions/framework and the architecture of Blockchain-based applications.

Module Intended Outcomes (MIOs) & Units of Competencies (UoCs)

Upon completion of the Module 4, candidates should be able to:

MIOs	Intended Outcomes / Competence	*Unit of Competencies (UoCs)
MIO-1	Understand the fundamental concepts of financial technologies (i.e. artificial intelligence, data analytics, cloud computing and Blockchain technologies) for Fintech applications in the banking industry.	109580L5/ 107594L5 109365L5 107438L5 109379L5 107442L5
MIO-2	Apply appropriate tools, frameworks, programming techniques and services of financial technologies in various use cases in the banking industry.	

**Note: For the details of the UoCs, please refer to the Specification of Competency Standards (SCS) of Retail Banking and Corporate & Commercial Banking which were developed by HKCAAVQ.*

Assessment Activity

Examination duration:	3 hours
Examination format:	Session A: Multiple Choice Questions (MCQ) with 50 questions Session B: 2 out of 3 Short Questions
Pass mark:	60% (Combined Mark for both sections)

Syllabus

Chapter 1: Tools and Applications for Artificial Intelligence and Big Data Analytics	
1.1	**Key roles and data literacy challenges in banks**
1.2	**History and definition of terminologies**
1.3	**General framework / steps to perform data analytics**
1.4	**Machine learning algorithms and evaluation metrics**
1.5	**Current development trend (NLP & deep learning / pattern recognition, biometric authentication) with use cases and applications such as news analysis, time series data analysis**
Chapter 2: Tools and Applications for Cloud Computing	
2.1	**Cloud computing as a paradigm**
2.2	**Key enabling technologies**
2.3	**Services models and types of clouds**
2.4	**Virtualisation, containers and orchestration**
2.5	**Serverless technologies**
2.6	**Charges and budgeting**
2.7	**Cloud and Fintech**
Chapter 3: Toos and Applications for Blockchain and Distributed Ledger Technology	
3.1	**What is Blockchain**
3.2	**Cryptocurrency and other applications of Blockchain**
3.3	**Major Blockchain solutions / frameworks for application development**
3.4	**Application development using Hyperledger Fabric**
3.5	**Introduction of the team structure / organisation of personnel for adopting Fintech to plan / design / implement banking products / services**

Recommended Readings

Essential Readings:

1. Androulaki, E., Barger, A., Bortnikov, V., Cachin, C., Christidis, K., De Caro, A., Enyeart, D., Ferris, C., Laventman, G., Manevich, Y., Muralidharan, S., Murthy, C., Nguyen, B., Sethi, M., Singh, G., Smith, K., Sorniotti, A., Stathakopoulou, C., Vukolić, M., … Yellick, J. (2018). Hyperledger fabric. Proceedings of the Thirteenth EuroSys Conference. [https://doi.org/10.1145/3190508.3190538]
2. Armbrust et al (2009). Above the Clouds: A Berkeley View of Cloud Computing. 25 pages. [https://www2.eecs.berkeley.edu/Pubs/TechRpts/2009/EECS-2009-28.pdf]
3. Cloudflare. What is the cloud? [https://www.cloudflare.com/learning/cloud/what-is-the-cloud/. Cloudflare Inc.]
4. Kaggle [https://www.kaggle.com/]
5. McKinney, Wes (2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython. O'Reilly Media
6. Pandas [https://pandas.pydata.org/docs/getting_started/index.html]
7. Surianarayanan, Chellammal & Pethuru Raj Chelliah (2019). Essentials of Cloud Computing: A Holistic Perspective. Springer Nature.
8. Vitualization Overview White Paper. 11 pages. [https://www.vmware.com/pdf/virtualization.pdf. Vmware.]

Supplementary Readings

1. Barroso, Luiz Andre & Holzle, Urs (2009). The Datacenter as a Computer, An Introduction to the Design of Warehouse-Scale Machines [https://www.morganclaypool.com/doi/pdf/10.2200/S00193ED1V01Y200905CAC006. Morgan & Claypool Publishers.]
2. Corda. (2020, July 30). What is Corda? [https://www.corda.net/blog/what-is-corda/]
3. Murthy, M. (2018, April 18). Life cycle of an Ethereum transaction [https://medium.com/blockchannel/life-cycle-of-an-ethereum-transaction-e5c66bae0f6e.]
4. Ng, A. Machine learning [https://www.coursera.org/learn/machine-learning. Stanford Online, Coursera]
5. Stanfordonline. (2019, March 11). Stanford CS224N: NLP with Deep Learning [https://www.youtube.com/watch?v=8rXD5xhemo&list=PLoROMvodv4rOhcuXMZkNm7j3fVwBBY42z. Youtube.]
6. The Linux Foundation. (2021). Blockchain: Understanding Its Uses and Implications [https://www.edx.org/course/Blockchain-understanding-its-uses-and-implications]

Further Readings

1. Amazon Financial Services [https://aws.amazon.com/financial-services/]
2. Geron, Aurelien (2019). Hands-On Machine Learning with Scikit-Learn Keras, and

TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems. O'Reilly Media

3. Stanfordonline. (2019, March 21). Stanford CS230: Deep Learning [https://www.youtube.com/watch?v=PySo_6S4ZAg&list=PLoROMvodv4rOABXSygHTsbvUz4G_YQhOb. YouTube.]
4. Turnbull, James (2014). The Docker Book: Containerization is the new virtualization. James Turnbull
5. Zastrin (2021). Ethereum Primer [https://www.zastrin.com/courses/ethereum-primer/lessons/1-1]