

**Associate Fintech Professional
(CPFinT(A))**

<QF Level 5>¹

**Certified Fintech Professional
(Management)
(CPFinT(M))**

<QF Level 6>²

**Certified Fintech Professional
(Specialist – Artificial Intelligence and Big Data Stream)
(CPFinT(S-AIBD))**

<QF Level 6>³

**Certified Fintech Professional
(Specialist – Distributed Ledger Technology Stream)
(CPFinT(S-DLT))**

<QF Level 6>⁴

**Certified Fintech Professional
(Specialist – Open Banking and Application Programming Interface Stream)
(CPFinT(S-OBAPI))**

<QF Level 6>⁵

**Certified Fintech Professional
(Specialist – Regtech Stream)
(CPFinT(S-RT))**

<QF Level 6>⁶

**Programme Handbook
(Syllabus, Regulations and General Information)**

CPFinT(A) CPFinT(M) CPFinT(S-AIBD) CPFinT(S-DLT)
CPFinT(S-OBAPI) CPFinT(S-RT)

¹ The Professional Qualification “Associate Fintech Professional (CPFinT(A))” is recognised under the QF at Level 5. (Recognised under the QF at Level 5, QR Registration No.: 22/000742/L5, Validity Period from 12/09/2022 to 31/07/2025)

² The Professional Qualification “Certified Fintech Professional (Management) (CPFinT(M))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000867/L6) (Validity Period from 01/11/2022 to 31/07/2025)

³ The Professional Qualification “Certified Fintech Professional (Specialist – Artificial Intelligence and Big Data Stream) (CPFinT(S-AIBD))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000868/L6) (Validity Period from 01/11/2022 to 31/07/2025)

⁴ The Professional Qualification “Certified Fintech Professional (Specialist – Distributed Ledger Technology Stream) (CPFinT(S-DLT))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000869/L6) (Validity Period from 01/11/2022 to 31/07/2025)

⁵ The Professional Qualification “Certified Fintech Professional (Specialist – Open Banking and Application Programming Interface Stream) (CPFinT(S-OBAPI))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000870/L6) (Validity Period from 01/11/2022 to 31/07/2025)

⁶ The Professional Qualification “Certified Fintech Professional (Specialist – Regtech Stream) (CPFinT(S-RT))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000871/L6) (Validity Period from 01/11/2022 to 31/07/2025)

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1. Introduction

With the aim of supporting capacity building and talent development for banking professionals, the Hong Kong Monetary Authority (HKMA) has been working together with the banking industry to introduce an industry-wide competency framework - “**Enhanced Competency Framework (ECF) for Banking Practitioners**” in Hong Kong.

Since the implementation of ECF in 2018, various programmes for different job functions in banking industry have been developed and integrated into The Hong Kong Institute of Bankers’ (HKIB) flagship Certified Banker (CB) Programme which offer generalist, specialist, and strategic topics. The rationale for putting all programmes under one professional banking qualification is to promote an industry-based common qualifications benchmark. While ECF programmes offer “role-based” knowledge and certification to relevant practitioners, CB is offering a vocational qualification pathway for further career advancement, being continuously enhanced to nurture more holistic banking professionals and ultimately, supporting the industry to develop a continuous learning culture and a sustainable talent pool so as to maintain the competitiveness of Hong Kong as an international financial centre.

The Enhanced Competency Framework on Financial technology (“Fintech”) (hereinafter referred to as “ECF-Fintech”) was introduced to develop a sustainable pool for the banking industry. The qualification structure of the ECF-Fintech comprises two levels: Core Level and Professional Level, targeting entry level and junior level staff and staff taking up middle or senior positions in Fintech-related job roles.

As the programme and qualification provider of the ECF-Fintech, HKIB has developed the learning programme – the “**ECF-Fintech (Core Level)**” to help individuals attain the Core Level of the competency standards set for the ECF-Fintech. The programme “**ECF-Fintech (Professional Level)**” helps individuals attain the Professional Level of the competency standards.

This Handbook provides programme details and relevant information for the learner who wants to complete the ECF-Fintech training and examination with the intent of obtaining the Professional Qualifications of “**Associate Fintech Professional (CPFinT(A))**”, “**Certified Fintech Professional (Management) (CPFinT(M))**”, “**Certified Fintech Professional (Specialist – Artificial Intelligence and Big Data Stream (CPFinT(S-AIBD))**”, “**Certified Fintech Professional**

(Specialist – Distributed Ledger Technology Stream (CPFinT(S-DLT)), “Certified Fintech Professional (Specialist – Open Banking and Application Programming Interface Stream (CPFinT(S-AIBD)) and “Certified Fintech Professional (Specialist – Regtech Stream (CPFinT(S-RT))).

For more details, please refer to the HKMA’s Guide to Enhanced Competency Framework on Fintech at [Guide to Enhanced Competency Framework on Fintech](#) issued by HKMA dated 3 December 2021 or you may visit [HKIB's ECF-Fintech webpage](#).

2. Background

2.1 Aims

The aims of the ECF-Fintech are twofold:

- (i) To develop a sustainable Fintech talent pool for the banking industry; and
- (ii) To raise and maintain the professional competence of Fintech practitioners in the banking industry.

2.2 Competency Standards

They are set at two levels:

Core Level – This level is applicable to entry level and junior level Fintech practitioners in Authorized Institutes (AIs).

Professional Level – This level is applicable to Fintech practitioners taking up middle or senior positions in AIs. In order to more accurately reflect the different areas of expertise, this level is further divided into two tracks: Management Track and Specialist Track.

2.3 Scope of Application

The ECF-Fintech aims to develop an all-rounded Fintech competency framework to enhance the professional competencies of Fintech practitioners working in functions that involve technological innovation for financial services in the banking industry. Specifically, it is aimed at “Relevant Practitioners” located in the Hong Kong office of an AI whose primary responsibilities are to perform one or multiple job roles listed in the table below.

Job Roles	Role Description (Core Level)	Role Description (Professional Level)
Role 1 – Fintech Solution Development	Design, develop, test, and deliver the core functional and technical aspects of Fintech solutions for the AI. Work closely with cross-functional teams, and coordinate projects on Fintech solutions throughout the software development lifecycle.	Provide expert advice on Fintech applications. Work with cross-functional teams to build and implement Fintech solutions for the AI.
Role 2 – Fintech Product Design	Design and develop new Fintech products with innovative features and functionalities driven by user needs or market forces.	Oversee the design, development, and management of Fintech products and ensure products’ alignment with the

		AI's overall Fintech strategic direction and product compliance.
Role 3 – Fintech Strategy and Management	Assist in the research and execution of Fintech strategy, and manage the Fintech initiatives of the AI in collaboration with internal stakeholders and external vendors and partners.	Drive Fintech agenda within the AI, and provide strategic direction for the AI's Fintech initiatives.
Role 4 – Regtech	Assist in Regtech research, use case formulation, regulatory and business requirements consolidation, vendor selection and Regtech solution development, etc. along the Regtech adoption journey to enhance the efficiency and effectiveness of the AI's risk management and regulatory compliance.	Lead and drive the design, development and implementation of Regtech solutions and the change management to ensure alignment with the AI's overall Regtech strategy and realization of benefits of Regtech.

For more details about the key tasks, please refer to Annex 1 ECF-Fintech: Key Roles and Tasks for Relevant Practitioners of HKMA [Guide to Enhanced Competency Framework on Fintech. \(Annex 1\)](#)

2.4 Certification and Public Register

There are six Professional Qualifications under the ECF-Fintech:

Core Level

Associate Fintech Professional (CPFinT(A))

A Relevant Practitioner may apply to HKIB for the professional qualification certification if he or she:

- (1) has completed all the four Core Level training modules (Modules 1 to 4) and obtained a pass in the relevant examination of each module plus 1 year of relevant work experience in Fintech projects and/or any of the Core Level functions in Fintech Solution Development, Fintech Product Design, Fintech Strategy and Management or Regtech as specified in Annex 1; or
- (2) is grandfathered based on the required work experience upon the launch of the Core Level module and employed by an AI at the time of application.

Professional Level - Management Track***Certified Fintech Professional (Management) (CPFinT(M))***

A Relevant Practitioner may apply to HKIB for professional qualification certification if he or she:

- (1) has completed Module 5, Module 9, and Module 10 of the ECF-Fintech Professional Level training programme and obtained a pass in the relevant examination of each module on top of the Core Level qualification plus at least 3 years of relevant work experience in Fintech projects and / or any of Professional Level functions in Fintech Solution Development, Fintech Product Design, Fintech Strategy and Management or Regtech as specified in Annex 1; or
- (2) is grandfathered based on the required work experience upon the launch of the Professional Level module and employed by an AI at the time of application.

Professional Level - Specialist Track***Certified Fintech Professional (Specialist – Artificial Intelligence and Big Data Stream) (CPFinT(S-AIBD))******Certified Fintech Professional (Specialist - Distributed Ledger Technology Stream) (CPFinT(S-DLT))******Certified Fintech Professional (Specialist - Open Banking and Application Programming Interface Stream) (CPFinT(S-OBAPI))******Certified Fintech Professional (Specialist - Regtech Stream) (CPFinT(S-RT))***

A Relevant Practitioner may apply to HKIB for professional qualification certification if he or she:

- (1) has completed Module 5 and one of the following modules for fulfilling the technical specialist stream of the Professional Level training programme and obtained a pass in the examination of the relevant modules on top of the Core Level qualification plus at least 3 years of relevant work experience in Fintech projects and / or any of the Professional Level functions in Fintech Solution Development, Fintech Product Design, Fintech Strategy and Management or Regtech as specified in Annex 1:
 - Module 6 for Artificial Intelligence and Big Data stream
 - Module 7 for Distributed Ledger Technology (DLT) stream
 - Module 8 for Open Banking and Application Programming Interface (API) stream

- Module 11 for Regtech stream
- or
- (2) is grandfathered based on the required work experience upon the launch of the Professional Level module and employed by an AI at the time of application.

For details regarding grandfathering requirements, please refer to [Guidelines of Grandfathering Application for ECF-Fintech](#) in [ECF-Fintech webpage](#) and Section 7 of the [HKMA Guide to Enhanced Competency Framework on Fintech](#).

By going through HKIB certification process successfully, the respective certification holders are then registered as Certified Individuals (CI) and included in the public register on HKIB website. HKIB will also grant the certification holders a professional membership of HKIB.

2.5 Annual renewal of certification and CPD Requirements

The ECF-Fintech certification is subject to annual renewal by HKIB. Certification holders are required to meet the annual Continuing Professional Development (CPD) requirements and pay an annual certification fee to renew the certification.

For both the Core Level and Professional Level qualifications, a minimum of 12 CPD hours is required for each calendar year (ending 31 December), of which at least 4 CPD hours should be on topics related to innovative technology (e.g. artificial intelligence, big data, cloud computing, cybersecurity, distributed ledger technology, and / or open banking and API), product development, business strategy and marketing, finance and investment, and / or risk and compliance.

Any excess CPD hours accumulated within a particular year cannot be carried forward to the following year.





No CPD is required in the first calendar year when above certification(s) is granted. The CPD requirement starts in the following calendar year.

Please refer to the [Overview of HKIB CPD Scheme](#) and [HKIB CPD Requirements webpage](#) for more details.

3. ECF-Fintech (Core Level) Programme Overview

3.1 Entry Requirements

The Programme is open to members and non-members of HKIB. Learners must fulfil the stipulated minimum entry requirements:

-  A Bachelor's Degree in any discipline awarded by a recognised university or equivalent; or
-  An Associate Degree (AD) / Higher Diploma (HD) in a banking, finance, technology or related discipline or equivalent; or
-  A relevant professional qualification; or
-  Mature applicants with 3 years of relevant banking experience with recommendations from employer

Remarks:

1. *3rd or final year full-time university undergraduate students in a banking, finance, technology or related discipline will be considered.*
2. *Mature applicants (aged 21 or above) who do not possess the above academic qualifications but with relevant banking experience and recommendation from their employers will be considered on individual merit.*

3.2 Programme Objectives


This programme is developed to nurture a broad and sustainable talent pool of entry level and junior level Fintech practitioners for the banking industry. Learners will be equipped with professional knowledge and technical expertise to better respond to innovative financial and technological trends.

3.3 Programme Intended Learning Outcomes

Upon completion of the Programme, learners should be able to:

-  Acquire the key aspects of Fintech application in banking and financial services.
-  Demonstrate in-depth knowledge of the legal and regulatory framework for Fintech governing banking and financial services in Hong Kong.
-  Acquire essential knowledge of the financial system, banking products and services.
-  Integrate and apply Fintech skills and knowledge to tackle banking and financial services industry challenges and develop practical recommendations or solutions.
-  Analyse latest digital developments in Hong Kong and overseas and identify new

opportunities for Fintech innovation in banking products, services, and platform.

-  Apply the essential principles and industry standards to support the design, development, and promotion of Fintech solutions.

3.4 Learning Hours

The programme design adopts a blended learning approach. Learners are advised to spend not less than 800 Learning Hours (equivalent to 80 credits) in total for completing a full programme. Learning time refers to the amount of time an average learner is expected to take to complete all learning pertaining to the Programme and achieve the learning outcomes expected. It includes time spent on all learning modes and activities such as training class, self-study and assessment hours.

The Programme comprises of the following 4 modules as accumulated a total of 80 credits.

- Module 1: Technology Essentials (20 credits)
- Module 2: Banking and Risk Essentials (20 credits)
- Module 3: Fintech Practicum (20 credits)
- Module 4: Fundamental Fintech Tools and Applications (20 credits)

3.5 Completion Requirements

The completion period for the Programme is eight years from the year in which the first module is completed.

Learners are required to complete all four modules and accumulated a total of 80 credits by obtaining a pass in all relevant examinations.

3.6 Integration in Certified Banker (CB)

The “ECF-Fintech (Core Level)” is integrated in the Certified Banker (Stage II) as one of the Elective Modules.

CB (Stage II) is a professional banking qualification programme developed and offered by HKIB. It is intended to raise the professional competency of banking and financial practitioners in Hong Kong to meet modern demands, while providing a transparent standard with international recognition.

Individuals who have completed the “ECF-Fintech (Core Level)” programme and obtained a pass at the relevant examination or have been grandfathered “Professional Certificate for ECF-Fintech (Core Level)” programme and obtain a pass at HKIB’s exemption assessment are encouraged to join the CB (Stage II) Programme.

3.7 Qualifications Framework


The Professional Qualification “Associate Fintech Professional (CPFinT(A))” is recognised under the QF at Level 5. (QR Registration No.: 22/000742/L5) (Validity Period from 12/09/2022 to 31/07/2025)

Please refer to the [accreditation page](#) on HKIB website for more details.

4. ECF-Fintech (Professional Level) Programme Overview

4.1 Entry Requirements

The Programme is open to members and non-members of HKIB. Learners must fulfil the stipulated minimum entry requirements:

-  Professional Certificate for ECF-Fintech awarded by HKIB; or
-  Grandfathered for ECF-Fintech Core Level Programme by HKIB

4.2 Programme Objectives

Management Track

This programme is developed to nurture a sustainable talent pool of middle or senior level Fintech practitioners for the banking industry. Learners will acquire a more in-depth understanding of the Fintech development trends, regulatory updates, and technology advancement to develop capabilities and formulate insights to drive and manage Fintech transformation within the organisation.



Specialist Track





This programme is developed to nurture a sustainable talent pool of more experienced and specialised expert level Fintech practitioners for the banking industry. Learners will achieve mastery within a specific Fintech domain on technology principles and applications in the banking industry to advise on Fintech use cases, solution architecture, and implementation management.

4.3 Programme Intended Learning Outcomes

Upon completion of the Programme, learners should be able to:

Management Track

-  Keep abreast of the key aspects of Fintech application in banking and financial services.
-  Analyse the competitive landscape and the applications of the latest technology, and formulate Fintech growth strategies.

-  Articulate banking product vision and business requirements clearly with business stakeholders and Fintech professionals.
-  Formulate strategies and policies for implementing Fintech projects with well managed scope, resources, and quality.
-  Develop breakthrough solutions by leveraging technology adoption to cope with major constraints and challenges.
-  Formulate, monitor and review the control measures related to compliance of Fintech products with relevant banking and data privacy regulations.

Specialist Track

-  Drive practical Fintech adoption in a range of applicable business contexts.
-  Acquire in-depth knowledge and design rationale of Fintech solutions and applications in banks.
-  Evaluate new technologies and vendors in the market and supervise the application of technology concepts of relevant Fintech disciplines in solution design for addressing specific business scenarios and user pain points.
-  Formulate policies for the design, development, and implementation of Fintech solutions.
-  Formulate the implementation approach and guidelines in Fintech projects after reviewing the solution architecture.
-  Establish and enforce policies and standards on Fintech software engineering across different coding practices, design patterns, production processes, and system operations.

4.4 Learning Hours

The programme design adopts a blended learning approach. Learners are advised to spend not less than 900 Learning Hours for Management Track (equivalent to 90 credits) or 600 Learning Hours for Specialist Track (equivalent to 60 credits) in total for completing the following full Programme. Learning time refers to the amount of time an average learner is expected to take to complete all learning pertaining to the Programme and achieve the learning outcomes expected. It includes time spent on all learning modes and activities such as training class, self-study and assessment hours.

The Programme comprises of the following modules and the accumulated credits for each track are as follow:

- Management Track: 90 credits
- Specialist Track – Artificial Intelligence and Big Data Stream: 60 credits
- Specialist Track – Distributed Ledger Technology Stream: 60 credits
- Specialist Track – Open Banking and Application Programming Interface Stream: 60 credits
- Specialist Track – Regtech Stream: 60 credits

Module 5: Regulatory Trends and Data Ethics (30 credits)

Module 6: Artificial Intelligence and Big Data (30 credits)

Module 7: Distributed Ledger Technology (DLT) (30 credits)

Module 8: Open Banking and Application Programming Interface (API) (30 credits)

Module 9: Business Strategy and Marketing (30 credits)

Module 10: Fintech Product Management (30 credits)

Module 11: Regtech (30 credits)

4.5 Completion Requirements

The completion period for the Programme is eight years from the year in which the first module is completed.

Learners are required to complete all related modules for each track with an accumulated credits as required by obtaining a pass in all relevant examinations.

4.6 Qualifications Framework

The Professional Qualification “Certified Fintech Professional (Management) (CPFinT(M))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000867/L6) (Validity Period from 01/11/2022 to 31/07/2025)

The Professional Qualification “Certified Fintech Professional (Specialist – Artificial Intelligence and Big Data Stream) (CPFinT(S-AIBD))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000868/L6) (Validity Period from 01/11/2022 to 31/07/2025)

The Professional Qualification “Certified Fintech Professional (Specialist – Distributed

Ledger Technology Stream) (CPFinT(S-DLT))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000869/L6) (Validity Period from 01/11/2022 to 31/07/2025)

The Professional Qualification “Certified Fintech Professional (Specialist – Open Banking and Application Programming Interface Stream) (CPFinT(S-OBAPI))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000870/L6) (Validity Period from 01/11/2022 to 31/07/2025)

The Professional Qualification “Certified Fintech Professional (Specialist – Regtech Stream) (CPFinT(S-RT))”, is recognised under the QF at Level 6. (QR Registration No.: 22/000871/L6) (Validity Period from 01/11/2022 to 31/07/2025)

Please refer to the [accreditation page](#) on HKIB website for more details.

5. Learning Support

HKIB provides learners with a range of support services to help you throughout the learning journey. These services include answering your enquiries, managing the certification process, providing access to library resources, offering study materials, and maintaining an online learning platform. The aim of these services is to facilitate learners and increase the chances of success in the training and examination. Here are some highlights for your attention.

5.1 *HKIB Resources Corner Support*

The Resources Corner situated at the premises of HKIB provides the required learning resources required for study. Copies of the Recommended Readings are available in the Corner for borrowing. To provide updated learning resources to the members, HKIB has provided FREE internet and library service to the members.

Learners are encouraged to prepare the examination by acquiring relevant market information and module knowledge through various channels, e.g. reference readings, business journals, websites etc. Learners should be aware that such market information may be important and pertinent to the examinations.

5.2 *Market Information Updates*

HKIB regularly organises training courses, CPD programmes, conference, seminars and luncheon talks, industry events on current issues and developments in financial markets that candidates may find essential, helpful and relevant to their learning. Besides, HKIB provides members with updated market information through complimentary bi-monthly journal Banking Today, weekly e-news and first-hand internship opportunities.

For more details, please refer to [Events & Industry Initiatives](#) and [HKIB eLearning](#) under HKIB website.

5.3 *Mock Examination Paper for Examination Preparation*

To facilitate the learners to get better preparation for the examination, HKIB provides the mock examination paper for the learners as reference to better understand the examination format, structure and approach. Thus, all the questions shared from the mock examination paper will NOT be used in the official examination.

5.4 Learning Consultation Services

For learners require any learning consultation services related to the banking professional qualifications offered by HKIB, they may contact us through our customer service hotline at (852) 2153 7800 for making arrangement.

6. Programme Syllabus

6.1 Module 1: Technology Essentials

A. *Module Objective*

The module aims to introduce emerging financial and regulatory technologies, including artificial intelligence (AI), big data analytics, distributed ledger technology (DLT), cloud computing, open banking and API, Robotic Process Automation (RPA) and cybersecurity; to introduce Fintech trends, key disruption events in the banking industry and the impact of Fintech developments on banking industry operations; and to introduce local and overseas Fintech applications, use cases and the corresponding implications in the banking space.

B. *Module Intended Learning Outcomes*

Upon completion of this module, learners should be able to:

- Analyse, evaluate and apply the fundamental technical concepts and principles of emerging Fintech topics to assist in Fintech solution development.
- Identify the recent and emerging Fintech trends and developments and common Fintech applications in banks.

C. *Syllabus*

Chapter 1: Introduction to Financial Technology (Fintech) and Regtech	
1	- Introduction of emerging financial and regulatory technologies
2	- Key concepts and principles of artificial intelligence
3	- Key concepts and principles of big data analytics
4	- Key concepts and principles of distributed ledger technology (DLT)
5	- Key concepts and principles of cloud computing
6	- Key concepts and principles of open banking & API
7	- Key concepts and principles of Robotic Process Automation (PRA)
8	- Key concepts and principles of cybersecurity
Chapter 2: Fintech Trends and Developments	

1	- Recent Key Disruptive Events in Banking
2	- Fintech Development to enhance the Banking Operations and Customer Experience <ul style="list-style-type: none"> • Customer Experience and Centricity • Digital Product Services Development • Operation Efficiency Enhancement • Change Management
Chapter 3: Common Fintech Applications in Banks	
1	- Local and overseas Fintech applications
2	- Use-cases of the following technologies, including <ul style="list-style-type: none"> • Virtual assistant • Credit scoring • Authentication and biometrics • Remote onboarding

D. Recommended Readings

Essential Readings

1. Rubini, Agustin (2018). Fintech in a Flash: Financial Technology Made Easy. De G PRESS.
2. Mohan, D. (2020). The Financial Services Guide to Fintech: Driving Banking Innovation Through Effective Partnerships. Kogan Page. (Chapter 1, 2, 7 and 10).
3. Mills, Karen G. (2018). Fintech, Small Business & the American Dream: How Technology Is Transforming Lending and Shaping a New Era of Small Business Opportunity. Springer.

Supplementary Readings

1. Tanda, Alessandra & Schena, Cristiana-Maria (2020). FinTech, BigTech and banks: digitalisation and its impact on banking business models. Palgrave Pivot.
2. Tanda, A., & Schena, C. M. (2019). FinTech, BigTech and Banks. Springer Publishing.
3. Loesch, Stefan (2018). A Guide to Financial Regulation for Fintech Entrepreneurs. Wiley.

Further Readings

1. Anderson, Ross (2020). Security Engineering: A Guide to Building Dependable Distributed Systems. Wiley.
2. Benedict J. Drasch, André Schweizer and Nils Urbach. (2018) Integrating the

- 'Troublemakers': A taxonomy for cooperation between banks and fintechs. *Journal of Economics and Business*. Volume 100, November–December 2018, Pages 26-42. DOI: 10.1016/j.jeconbus.2018.04.002.
3. Valverde, Dantiago Carbo & Fernandez, Francisco Rodriguez (2020). Financial digitalization: Banks, Fintech, Bigtech, and consumers. *Journal of Financial Management, Markets and Institutions*, 08(01), 2040001.
 4. The Hong Kong Monetary Authority (2019). *Reshaping Banking with Artificial Intelligence*.
 5. Brett King (2018). *Bank 4.0: Banking Everywhere, Never at a Bank*. Wiley.

6.2 Module 2: Banking and Risk Essentials

A. **Module Objective**

The module aims to enable learners a clear understanding of corporate, institutional, commercial, and retail banking and articulate the offerings and distinction of different banking sectors; to provide learners knowledge of products and services, and respective banking functions and operations supports; to provide learners a clear picture of contemporary banking developments and local talent expectations, including local and international Fintech initiatives; to enhance learners' knowledge and understanding on risk management framework and methodologies, regulatory framework landscape, Regtech application and development.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Differentiate between different banking product offerings and study the differences between retail banking, commercial banking, corporate banking, and institutional banking.
- Recognise expectations for competency of local Fintech talent and stay up-to-date on banking Fintech developments and adopt local and international Fintech regulations and government initiatives.

C. **Syllabus**

Chapter 1: Retail and Commercial Banking (Fintech-related applications)	
1	- Fundamentals of retail and commercial banking <ul style="list-style-type: none"> • Key offering of a universal bank • Key business aspects covering by retail and commercial Banking
2	- Local market landscape <ul style="list-style-type: none"> • Critical factors to Retail Banking and Commercial Banking • Business size of authorized institution • Market Size of SMEs in Hong Kong
3	- Customer Segmentation <ul style="list-style-type: none"> • Retail Banking • Commercial Banking
4	- Channel Management
5	- Retail and SME Credit assessments

6	<ul style="list-style-type: none"> • Retail Banking Credit Assessments • Commercial Banking Credit Assessments <p>Summary</p>
Chapter 2: Corporate and Institutional Banking	
1	<ul style="list-style-type: none"> - Fundamentals of corporate and institutional banking <ul style="list-style-type: none"> • Overview • Client Segments • Products • Corporate Lending
2	<ul style="list-style-type: none"> - Customer relationship management <ul style="list-style-type: none"> • Definition and Framework • Key Elements for Successful CRM • Roles and Responsibilities of Relationship Managers • Other Key Parties • CRM under the Digital World
3	<ul style="list-style-type: none"> - Transaction banking and securities services <ul style="list-style-type: none"> • Trade Finance • Cash Management and Account Services • Securities Services • Key Areas of Concern and Opportunities in Transaction Banking
4	<ul style="list-style-type: none"> - Financial markets and treasury advisory <ul style="list-style-type: none"> • Money Markets • Fixed Income, Currencies and Commodities • Equities • Treasury Advisory • Key Areas of Concern and Opportunities in Finance Markets
5	<ul style="list-style-type: none"> - Corporate finance and others <ul style="list-style-type: none"> • Debt Capital Markets • Equity Capital Markets • Project Finance • M&A and Corporate Advisory • Key Areas of Concern and Opportunities in Corporate Finance • Other Corporate and Institutional Banking Services • Collaboration with Other Banking Sectors
Chapter 3: Contemporary Banking Trends	
1	<ul style="list-style-type: none"> - Smart Banking Initiatives <ul style="list-style-type: none"> • Faster Payment System • Enhanced Fintech Supervisory Sandbox

	<ul style="list-style-type: none"> • Promotion of Virtual Banking • Banking Made Easy initiative • Open Application Programming Interface • Closer cross-border collaboration • Enhanced research and talent development
2	<ul style="list-style-type: none"> - Faster Payment System (FPS) <ul style="list-style-type: none"> • Features • Benefits to Consumer • Benefits to Merchants and Corporates
3	<ul style="list-style-type: none"> - Enhanced Fintech Supervisory Sandbox (FSS) 2.0 <ul style="list-style-type: none"> • Objectives • Features • Usage
4	<ul style="list-style-type: none"> - Promotion of Virtual Banking <ul style="list-style-type: none"> • Selection Criteria of VB Application • VB Supervisory Approach • Key Risk Areas • New Personal Credit Products
5	<ul style="list-style-type: none"> - Banking Made Easy Initiative <ul style="list-style-type: none"> • Remote Customer Onboarding • Online Finance • Online Investment • Anti-Money Laundering & Counter-Financing of Terrorism • Regtech for prudential risk management and compliance • Machine-readable regulations
6	<ul style="list-style-type: none"> - Open Application Programming Interface (API) <ul style="list-style-type: none"> • Implementation Approach • Adoption Status of Commercial Banking • Benefits • Challenges • Essential practices for Phase III and IV implementation
7	<ul style="list-style-type: none"> - Cross-border collaboration <ul style="list-style-type: none"> • Collaboration in Guangdong-Hong Kong-Macau Bay Area • Central Bank Digital Currencies • Collaboration with Singapore • Project LionRock-Inthanon • Bank of International Settlements Innovation Hub Hong Kong Centre • Global Financial Innovation Network Cross-Border Testing
8	<ul style="list-style-type: none"> - Talent Development Programme

9	<ul style="list-style-type: none"> • Fintech Career Accelerator Scheme • Industry Project Masters Network Scheme • Enhanced Competency Framework
10	<ul style="list-style-type: none"> - Financial intermediation <ul style="list-style-type: none"> • Definition of Financial Intermediation • Strategies of Financial Intermediation • Latest development of Financial Intermediation in Hong Kong - Summary
Chapter 4: Risk Management and Regulatory Compliance	
1	<ul style="list-style-type: none"> - Overview of Risk Management in Banking <ul style="list-style-type: none"> • Introduction to Risk Management • Enterprise Risk Management • Importance of Risk Management in Banks • Big Losses of Financial Institutions • Risk Management Framework
2	<ul style="list-style-type: none"> - Tools and Measures in Risk Management <ul style="list-style-type: none"> • Value-at-Risk (VaR) • Advantages/Drawbacks of VaR • Expected Shortfall (ES) • Coherent Risk Measures • Back-Testing • Scenario Analysis and Stress Testing • Scenario Design • Reverse Stress Testing • Regulation on Stress Testing • Economic Capital • Risk-adjusted Return on Capital (RAROC)
3	<ul style="list-style-type: none"> - International Regulatory Framework: Basel III Standards and Trend of De-velopment in FinTech Regulation Landscape <ul style="list-style-type: none"> • Importance of Regulating Banks • Introduction to BASEL • BASEL III • Capital Definition & Requirements • Capital Conservation Buffer • Countercyclical Buffer • Leverage Ratio • Liquidity Ratios • Capital for CVA Risk • G-SIBs

4	<ul style="list-style-type: none"> • D-SIBs • FinTech Regulations: Current State in Hong Kong • Evolving Regulatory Landscape on Other Jurisdictions - RegTech: Overview and Emerging Trend of Development <ul style="list-style-type: none"> • Introduction to RegTech • Evolution of RegTech • Importance of RegTech to the Banking Industry • RegTech's Underlying Technologies • RegTech's Application Areas • RegTech: Current State and Government Initiatives • RegTech Adoption in Hong Kong: Opportunities and Challenges • Case Studies and Insights: RegTech Applications in Banks • SupTech and HKMA's Adoption of SupTech • Future of RegTech
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D. Recommended Readings

Essential Readings

1. John C. Hull. (2018). Risk Management and Financial Institutions Fifth Edition. Wiley

Supplementary Readings

1. Tata, F. (2020). Corporate and investment banking: Preparing for a career in sales, trading, and research in global markets. Springer Nature
2. Walker, T., & Morris, L. (2021). The handbook of banking technology. Wiley
3. Boston Consultant Group. (2018). Redefining corporate client relationships in a digital world.
4. Deloitte. (2017). Modernizing transaction banking: Service externalization and the right technology portfolio.
5. Guo, Y. (2017). Implementing relationship banking strategies and techniques and improving customer value. Finance and Market, 2(2).
6. Hong Kong Monetary Authority. (2018, October 30). The launch of etradeconnect and the collaboration with we.trade.
7. Hong Kong Monetary Authority (2021, July 29). Supervisory policy manual: CR-G-1, CR-S-2, TA-2, IR-1, CR-G-13, CR-G-14.
8. Hong Kong Monetary Authority. (2021, February 23). Joint statement on the multiple central bank digital currency (m-CBDC) bridge project.
9. Oliver Wyman and International Securities Services Association (2020). The future of securities services.

10. Payne, A., & Frow, P. (2005). A strategic framework for customer relationship management. *Journal of marketing*, 69(4), 167-176.
11. World Bank. (2018, August 23). World bank prices first global blockchain bond, raising A\$110 million.
12. World Bank. (2019, August 16). World bank issues second tranche of blockchain bond via bond-i.
13. Berger, A. N., & Udell, G. F. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance*, 30(11), 2945–2966.
14. Boston Consultant Group (2019). Retail-Banking Distribution 2025 Up Close and Personal.
15. Boobier, T. (2020). *AI and the Future of Banking*. John Wiley and Sons.
16. Guide, A. B. I. C. (2012). *Customer Management in SME Banking*.
17. HK Financial Services Development Council (2020). *Family Wisdom: A Family Office Hub in Hong Kong*.
18. Hong Kong Monetary Authority (2001). *Sharing of Consumer Credit Data through a Credit Reference Agency*.
19. Hong Kong Monetary Authority (2002). *Best Practices for Credit Card Operations*.
20. Hong Kong Monetary Authority (2021). *HKMA Monthly Statistical Bulletin (July 2021)*.
21. International Finance Corporation (2009). *The SME Banking Knowledge Guide*.
22. International Finance Corporation (2012). *Customer Management in SME Banking: A Best-in-Class Guide*.
23. Quinlan and Associates. (March 2021). *Branching Off*.
24. Rogers, Martha; Peppers, Don. (2016). *Differentiating Customers by Their Needs*. In *Managing Customer Relationships* (pp. 187–215). John Wiley & Sons, Inc.
25. Rogers, Martha; Peppers, Don. (2016). *Differentiating Customers by Their Needs*. In *Managing Customer Relationships* (pp. 187–215). John Wiley & Sons, Inc.
26. Securities and Futures Commission. (2021). *Asset and Wealth Management Activities Survey 2020*.
27. Trade and Industry Department, The Government of HK SAR. (2021). *Small and medium enterprises (SMEs)*.
28. W.Up. (2018). *Segments of One: Customer Insights in Digital Marketing*.
29. Walker, T., & Morris, L. (2021). *The Handbook of Banking Technology*. John Wiley & Sons.
30. Bodea, T., & Ferguson, M. (2014). *The Ideas Behind Customer Segmentation*. In *Segmentation, Revenue Management and Pricing Analytics* (pp. 11–17). Routledge.
31. Albastaki, & Albastaki, Yousif. (2021). *Innovative strategies for implementing FinTech in banking*. Business Science Reference.
32. Accenture (2020). *The Next Phase of the Banking Open API Journey*.

33. Bank for International Settlements (2020). Rise of the central bank digital currencies: drivers, approaches and technologies.
34. Banking Ordinance, Authorization of Virtual Banks A Guideline issued by the Monetary Authority under Section 16(10).
35. Beck, H. (2001). Banking is essential, banks are not. The future of financial intermediation in the age of the Internet. *Netnomics*, 3(1), 7-22.
36. Boďa, M., & Zimková, E. (2021). A DEA model for measuring financial intermediation. *Economic Change and Restructuring*, 54, 339-370.
37. ebrary, I., & Books24x7, I. (2011). Business knowledge for IT in global retail banking a complete handbook for IT professionals. Essvale Corp.
38. Europe Banking Association (2017). Open Banking: advancing customer-centricity
39. Farrow, G. S. (2020). An application programming interface model for open banking ecosystems. *Journal of Payments Strategy & Systems*, 14(1), 75-91.
40. Finnovate Research (2018). Neo Banks - Performance and new ideas.
41. GFIN Report (2019).
42. Greenbaum, Thakor, Boot, Thakor, Anjan V, & Boot, Arnoud W. A. (2020). Contemporary financial intermediation. (Fourth edition / Stuart I. Greenbaum, Anjan V. Thakor, Arnoud W.A. Boot.). Academic Press.
43. Hong Kong Interbank Clearing Limited (HKICL).
44. HKMA (2020). International Financial Centre.
45. HKMA Banking Made Easy Initiative.
46. HKMA Circular B1/15C B9/29C, Fintech Supervisory Sandbox (FSS).
47. HKMA Circular B10/1C B1/15C, Remote on-boarding of corporate customers.
48. HKMA Circular B10/1C B1/15C, Remote on-boarding and iAM Smart.
49. HKMA Closer Cross-border Collaboration.
50. HKMA Enhanced Competency Framework.
51. HKMA Fintech Supervisory Sandbox.
52. HKMA Fintech Career Accelerator Scheme (FCAS) – Gap Year Placement Programme.
53. HKMA Insights (2020). Wealth Management Connect Scheme in the Greater Bay Area.
54. HKMA Insight (2021). New Personal Credit Products by Virtual Banks.
55. HKMA Press Releases (2017). A New Era of Smart Banking.
56. HKMA Press Releases (2017). Latest Development on the Era of Smart Banking.
57. HKMA Press Releases (2018). FPS New Account Proxy -HKID Number.
58. HKMA Press Releases (2018). Application of Financial Technology in Personal Lending Business.
59. HKMA Press Releases (2019). Granting of Virtual Banking License 27 March 2019.
60. HKMA Press Releases (2019). Hong Kong FinTech Week 2019.

61. HKMA Press Releases (2020). Hong Kong FinTech Week 2020.
62. HKMA Press Releases (2021). HKMA Promulgates Implementation Details for Cross-boundary Wealth Management Connect Pilot Scheme in the Guangdong-Hong Kong-Macao Greater Bay Area.
63. HKMA Press Releases (2021). The HKMA Unveils “Fintech 2025” Strategy.
64. HKMA Regtech Watch Issue No. 3 (2020).
65. HKMA Revised Guidelines for New Personal-Lending Portfolio (NPP).
66. HKMA Speeches (2020). Welcoming Remarks at HKMA Fintech Day.
67. HKMA Speeches (2021). BIS Innovation Summit 2021 “Central Bank Innovations: Payments, Data and Capabilities”.
68. HKMA Supervisory Policy Manual (SPM) (AML 1 - V.1 – 19.10.18)
69. Hong Kong Government Consultation Paper (2018). Global Financial Innovation Network (GFIN) Consultation document.
70. KPMG (2020). Transforming Risk Management and Compliance: Harnessing the Power of Regtech.
71. KPMG (2021). Regtech Adoption Practice Guide, Issue #2: Anti-Money Laundering/Counter-Financing of Terrorism.
72. OCED (2021). Central Bank Digital Currencies and payments: A review of domestic and international implications.
73. PWC (2020). Reshaping Banking with Artificial Intelligence.
74. SFC (2019). Guidelines on Online Distribution and Advisory Platforms
75. Tanda, A., & Schena, C.-M. (2019). FinTech, BigTech and banks: digitalisation and its impact on banking business models. Palgrave Macmillan.
76. Bank for International Settlements (BIS). (Basel Committee on Banking Supervision reforms - Basel III.
77. Los Angeles Times. (2013, Dec 21) Wells Fargo's Pressure-Cooker Sales Culture Comes at a Cost.
78. Hong Kong Monetary Authority (HKMA) (2001, Jan 19) Supervisory Policy Manual IN. Introduction.
79. Hong Kong Monetary Authority (HKMA) (2019, Dec 27) Supervisory Policy Manual GL. Glossary. Introduction.
80. Hong Kong Monetary Authority (HKMA) (2001, Oct 11) Supervisory Policy Manual SA-1. Risk-based Supervisory Approach.
81. Hong Kong Monetary Authority (HKMA) (2017, Oct 06) Supervisory Policy Manual IC-1. Risk Management Framework.
82. Hong Kong Monetary Authority (HKMA) (2021, Jan 21) Circulars & Guidance Papers. Circulars. Report on “AML/CFT Regtech: Case Studies and Insights” Encl. AML/CFT Regtech: Case Studies and Insights.
83. Hong Kong Monetary Authority (HKMA) (2020, Nov). Transforming Risk

- Management and Compliance: Harnessing the Power of Regtech.
84. Hong Kong Monetary Authority (HKMA) (2019, Nov 12). Inaugural Issue of Regtech watch.
 85. Hong Kong Monetary Authority (HKMA) (2019, Nov 12). Regtech Watch Issue No. 1.
 86. Hong Kong Monetary Authority (HKMA) (2020, Mar 16). Regtech Watch Issue No. 2.
 87. Hong Kong Monetary Authority (HKMA) (2020, Jun 12). Regtech Watch Issue No. 3.
 88. Hong Kong Monetary Authority (HKMA) (2020, Sep 18). Regtech Watch Issue No. 4.
 89. Hong Kong Monetary Authority (HKMA) (2020, Dec 16). Regtech Watch Issue No. 5.
 90. Hong Kong Monetary Authority (HKMA) (2021, Mar 19). Regtech Watch Issue No. 6.
 91. Hong Kong Monetary Authority (HKMA) (2021, Jun 17). Regtech Watch Issue No. 7.
 92. Hong Kong Monetary Authority (HKMA) (2021, Jun 17). Seventh and Final Issue of Regtech Watch.
 93. Hong Kong Monetary Authority (HKMA) (2021, Jun). First Issue of Regtech Adoption Practice Guide: Cloud-based Regtech Solutions.
 94. Hong Kong Monetary Authority (HKMA) (2021, Jul 26). Second Issue of Regtech Adoption Practice Guide: Anti-Money Laundering/Counter-Financing of Terrorism.
 95. Hong Kong Monetary Authority (HKMA) (2021, Sep 27). Third Issue of Regtech Adoption Practice Guide: Governance, Risk and Compliance.
 96. Hong Kong Monetary Authority (HKMA) (2021, Jun 08). HKMA Unveils "Fintech 2025" Strategy.
 97. Hong Kong Monetary Authority (HKMA) (2021, Jun 17). HKMA launches the Regtech Adoption Practice Guide series.
 98. Hong Kong Monetary Authority (HKMA) (2021, Jun 30). HKMA hosts its flagship Regtech event - "Unlocking the Power of Regtech".
 99. Hong Kong Monetary Authority (HKMA) (2020, Nov 03). HKMA developed a two-year roadmap to promote Regtech adoption.
 100. Hull C. (2018). Risk Management and Financial Institutions Fifth Edition. Wiley.
 101. Barberis J., Arner D., Buckley R. (2019). The RegTech Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries in Regulation. Wiley.
 102. Arner D. W., Barberis J., and Buckley R. P. (2017) FinTech, RegTech and the Re-conceptualization of Financial Regulation. Northwestern Journal of International Law & Business Vol. 37 Issue 3.

Further Readings

1. eTradeConnect. (2018). ETradeConnect.
2. Hong Kong Monetary Authority & Bank of Thailand. (2020, January). Inthanon-Li-onRock – Leveraging Distributed Ledger Technology to Increase Efficiency in Cross-Border Payments.
3. Hong Kong Monetary Authority (2021, July 29). Supervisory policy manual: CR-G-5,

- CR-G-8, AML-1, AML-2.
4. World Economic Forum. (2021, May 6). Digital Assets, Distributed Ledger Technology, and the Future of Capital Markets.
 5. Hong Kong Monetary Authority (HKMA) (2021, Apr 23) Supervisory Policy Manual CA-B-2. Systemically Important Banks.
 6. Hong Kong Monetary Authority (HKMA) (2018, Oct 19) Supervisory Policy Manual AML-1. Supervisory approach on Anti-Money Laundering and Counter-Financing of Terrorism.
 7. Hong Kong Monetary Authority (HKMA) (2018, Oct 19) Supervisory Policy Manual AML-2. Guideline on Anti-Money Laundering and Counter-Financing of Terrorism.
 8. Hong Kong Monetary Authority (HKMA) (2012, May 09) Supervisory Policy Manual IC-5. Stress-testing.
 9. Basel Committee on Banking Supervision (BCBS). (2011, Jun) Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems.

6.3 Module 3: Fintech Practicum

A. **Module Objective**

The module aims to introduce the basic concepts, methods, and approaches of data analytics in Fintech with various quantitative analysis techniques in developing analytical data models to support decision-making; to introduce the latest trend of technologies adoption, customers centric and testing methodologies in design and development of Fintech products in banking related services; to provide learners the fundamentals on Fintech project management and reporting, and equips students with knowledge and skills needed for the management of the processes, risks and compliance issues on the Fintech transformation project in Hong Kong.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Conduct business analytics, milestone monitoring, and stakeholder communication for Fintech projects.
- Apply the essential principles and industry standards of Fintech product design and development cycle fundamentals, including methodology selection and criteria evaluation.

C. **Syllabus**

Chapter 1: Business Analysis for Fintech Projects	
1	- Problem framing: Using Accounting and Finance Data to Frame Questions
2	- Master the Data: An Introduction to Accounting and Finance Data
3	- Master the Data: Preparing the Data for Analysis
4	- Perform the Analysis: Descriptive Analytics
5	- Perform the Analysis: Diagnostic Analytics
6	- Perform the Analysis: Predictive Analytics
7	- Perform the Analysis: Prescriptive Analytics
8	- Communicate the Results: Data Visualization and Report
Chapter 2: Fintech Product Design and Development	
1	- Fintech development in banking industry <ul style="list-style-type: none"> • The Bali Fintech Agenda of World Bank/IMF, and FinTech development in bank

2	<ul style="list-style-type: none"> - New Technologies adopted in Fintech applications <ul style="list-style-type: none"> • Basics of the advanced technologies (Technology Sensing/ biometrics, AI/ML, Big Data, NLP, Blockchain) • Applications of the advanced technologies in banking products • Lab: Basics of Blockchain technology and how payments are transacted on Blockchain (Eth.build sandbox)
3	<ul style="list-style-type: none"> - Fintech product design <ul style="list-style-type: none"> • Digital services in banking • Design essentials of fintech products • Introduction of Systems architecture • Lab: UX design of an application mock-up (pencil project)
4	<ul style="list-style-type: none"> - Fintech product development <ul style="list-style-type: none"> • Product development Tools • Development & User Research strategies • Testing Methodologies and Strategy
Chapter 3: Fintech Project Management and Reporting	
1	<ul style="list-style-type: none"> - Fundamentals of fintech project management <ul style="list-style-type: none"> • Overview • Linkage with Product Management • System for Value Delivery • Fintech Project Management Principles • Fintech Project Performance Domains • Fintech Project Development Approaches
2	<ul style="list-style-type: none"> - Stakeholder management <ul style="list-style-type: none"> • Stakeholder Management Framework • Stakeholder Engagement Steps • Stakeholder Communication • Stakeholder Satisfaction Measurement • Key Stakeholder - Customers • Key Stakeholder - Regulators • Key Stakeholder - Fintech Project Team
3	<ul style="list-style-type: none"> - Cross-functional coordination <ul style="list-style-type: none"> • Planning • Project Work • Delivery • Measurement and Reporting

4	- Agile methodologies <ul style="list-style-type: none"> • Agile Manifesto and 12 Principles • Agile Methodologies Overview • Lean • Kanban • Scrum • eXtreme Programming • Other Agile Methodologies
5	- Contemporary cases and issues on fintech project management <ul style="list-style-type: none"> • Selection of Approaches/ Models • Selection of Approaches - The APP Case • Managing Uncertainties and Risks • Fintech Project Failure - The ABC Case

D. Recommended Readings

Essential Readings

1. Project Management Institute. (2021). A guide to the project management body of knowledge (PMBOK® Guide) and the standard for project management (7th ed.). Project Management Institute.

Supplementary Readings

1. Richardson, Teeter & Terrell, McGraw-Hill (2019). Data Analytics for Accounting. McGraw Hill.
2. Richardson, Teeter & Terrell, McGraw-Hill (2020). Introduction to Data Analytics for Accounting. McGraw Hill.
3. Yousif Abdullatif Albastaki, Anjum Razzaque, Adel M. Sarea (2020), Innovative Strategies for Implementing FinTech in Banking. IGI Global.
4. OECD. (2020, 26 February). Digital Disruption in financial markets.
<https://www.oecd.org/daf/competition/digital-disruption-in-financial-markets.htm>
5. World Bank (2020, April). Digital Financial Services.
<https://pubdocs.worldbank.org/en/230281588169110691/Digital-Financial-Services.pdf>
6. World Bank (October 11, 2018). The Bali Fintech Agenda: A blueprint for successfully harnessing Fintech's opportunities.
<https://www.worldbank.org/en/news/press-release/2018/10/11/bali-fintech-agenda-a-blueprint-for-successfully-harnessing-fintechs-opportunities>
7. Hong Kong Monetary Authority. (2016, September 6). Fintech supervisory sandbox

- (FSS).
8. Hong Kong Monetary Authority (2017, November 28). Fintech supervisory chatroom.
 9. Hong Kong Monetary Authority (2021, July 29). Supervisory policy manual, CG-5 Guideline on a sound remuneration system.
 10. Bañuls, V. A., López, C., Turoff, M., & Tejedor, F. (2017). Predicting the impact of multiple risks on project performance: A scenario-based approach. *Project Management Journal*, 48(5), 95–114.
 11. Basten, D., Stavrou, G., & Pankratz, O. (2016). Closing the stakeholder expectation gap: Managing customer expectations toward the process of developing information systems. *Project Management Journal*, 47(5), 70–88.
 12. Copola Azenha, F., Aparecida Reis, D., & Leme Fleury, A. (2021). The role and characteristics of hybrid approaches to project management in the development of technology-based products and services. *Project Management Journal*, 52, 90–110.
 13. Hobbs, B. & Petit, Y. (2017). Agile methods on large projects in large organizations. *Project Management Journal*, 48(3), 3–19.
 14. Huo, X., Zhang, L., & Guo, H. (2016). Antecedents of relationship conflict in cross-functional project teams. *Project Management Journal*, 47(5), 52–69.
 15. Jinasena, D. N., Spanaki, K., Papadopoulos, T., & Balta, M. E. (2020). Success and failure retrospectives of fintech projects: A case study approach. *Information Systems Frontiers*, 1-16.
 16. Recker, J., Holton, R., Hummel, M., & Rosenkranz, C. (2017). How agile practices impact customer responsiveness and development success: A field study. *Project Management Journal*, 48(2), 99–121.
 17. Tereso, A., Ribeiro, P., Fernandes, G., Loureiro, I., & Ferreira, M. (2019). Project management practices in private organizations. *Project Management Journal*, 50, 6–22.

Further Readings

1. Gemino, A., Reich, B. H., & Serrador, P. M. (2021). Agile, Traditional, and Hybrid Approaches to Project Success: Is Hybrid a Poor Second Choice? *Project Management Journal*, 52, 161–175.
2. Global Financial Innovation Network (2019). GFiN – one year on: The global financial innovation network reflects on its first year.
3. Global Financial Innovation Network (2020). GFiN – cross-border testing lessons learned: The global financial innovation network reflects on the cross-border testing pilot.
4. Liu, J. Y. C. & Yuliani, A. R. (2016). Differences between clients' and vendors' perceptions of IT outsourcing risks: project partnering as the mitigation approach. *Project Management Journal*, 47(1), 45–58.

6.4 Module 4: Fundamental Fintech Tools and Applications

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.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- 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.
- Apply appropriate tools, frameworks, programming techniques and services of financial technologies in various use cases in the banking industry.

C. **Syllabus**

Chapter 1: Tools and Applications for Artificial Intelligence and Big Data Analytics	
1	- History and Definition of terminologies.
2	- General framework/steps to perform data analytics.
3	- Machine learning algorithms and evaluation metrics.
4	- 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	
1	- Cloud computing as a paradigm
2	- Key enabling technologies
3	- Service models and types of clouds
4	- Virtualization, containers and orchestration
5	- Serverless technologies
6	- Charges and budgeting

7	- Cloud and FinTech
Chapter 3: Tools and Applications for Blockchain and Distributed Ledger Technology	
1	- What is Blockchain?
2	- Cryptocurrency and other applications of Blockchain
3	- Major Blockchain Solutions/Frameworks for Application Development
4	- Application development using Hyperledger Fabric
5	- Introduction of the team structure/organization of personnel for adopting Fintech to plan/design/implement banking products/services

D. Recommended Readings

Essential Readings

1. McKinney, Wes (2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython. O'Reilly Media.
2. Pandas. https://pandas.pydata.org/docs/getting_started/index.html
3. Kaggle <https://www.kaggle.com/>
4. 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>
5. Virtualization Overview White Paper. 11 pages. <https://www.vmware.com/pdf/virtualization.pdf>. VMware.
6. Cloudflare. What is the cloud? <https://www.cloudflare.com/learning/cloud/what-is-the-cloud/>. Cloudflare Inc.
7. Surianarayanan, Chellammal & Pethuru Raj Chelliah (2019). Essentials of Cloud Computing: A Holistic Perspective. Springer Nature.
8. 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>

Supplementary Readings

1. Stanfordonline. (2019, March 11). Stanford CS224N: NLP with Deep Learning <https://www.youtube.com/watch?v=8rXD5xhemo&list=PLoROMvodv4rOh-cuXMZkNm7j3fVwBBY42z> Youtube.
2. Ng, A. Machine learning. <https://www.coursera.org/learn/machine-learning> Stanford Online, Coursera
3. 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.

4. The Linux Foundation. (2021). Blockchain: Understanding Its Uses and Implications
<https://www.edx.org/course/blockchain-understanding-its-uses-and-implications>
5. Murthy, M. (2018, April 18). Life cycle of an Ethereum transaction
<https://medium.com/blockchannel/life-cycle-of-an-ethereum-transaction-e5c66bae0f6e>
6. Corda. (2020, July 30). What is Corda? <https://www.corda.net/blog/what-is-corda/>

Further Readings

1. Stanfordonline. (2019, March 21). Stanford CS230: Deep Learning
https://www.youtube.com/watch?v=PySo_6S4ZAq&list=PLoROMvodv4rOA-BXSygHTsbvUz4G_YQhOb YouTube.
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. Turnbull, James (2014). The Docker Book: Containerization is the new virtualization. James Turnbull
4. Amazon Financial Services
<https://aws.amazon.com/financial-services/>
5. Zastrin (2021). Ethereum Primer.
<https://www.zastrin.com/courses/ethereum-primer/lessons/1-1>

6.5 Module 5: Regulatory Trends and Data Ethics

A. **Module Objective**

The module aims to introduce global regulatory trends, trans-border policies and collaborations, and latest developments in Fintech regulation, with emphasis on privacy management, and ethics.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Identify the regional Fintech regulatory trends and developments, including cross-border policies and collaborations.
- Recognise and respond to implications of data ethics, integrity, and risks associated with Fintech application opportunities.

C. **Syllabus**

Chapter 1: Introduction to Fintech Compliance	
1	- What is Fintech <ul style="list-style-type: none"> • Functional dimension • Technology dimension
2	- Business / financial regulations on Fintech <ul style="list-style-type: none"> • Business as usual / Technology neutral approach • Monetary stability • Financial stability • AML/CFT • Consumer protection • (Competition)
3	- Views / common concerns and efforts by local regulators <ul style="list-style-type: none"> • Hong Kong Monetary Authority (HKMA) • Office of the Privacy Commissioner for Personal Data (PCPD) • Office of the Communications Authority (OFCA)
4	- Unlearning and relearning personal data regulations
Chapter 2: Personal data regulatory regimes and core requirements	
1	- OCED Privacy Guidelines
2	- Hong Kong's Personal Data (Privacy) Ordinance (PDPO) <ul style="list-style-type: none"> • The six data protection principles (DPPs)
3	- EU General Data Protection Regulation (GDPR)

4	- Mainland China's Personal Information Protection Law (PIPL)
Chapter 3: Personal Data Regulatory Requirements and Management Tools	
1	- Specific regulatory requirements related to data <ul style="list-style-type: none"> • Direct Marketing • eDM – Unsolicited Electronic Messages Ordinance • Cross-border data transfer restrictions • Unsolicited Electronic Messages Ordinance • Data breach management • Data localisation and retention
2	- Management tools <ul style="list-style-type: none"> • Privacy by Design
Chapter 4: Management tools and regulatory requirements on 'traditional' technologies	
1	- Management tools <ul style="list-style-type: none"> • Data protection impact assessment • Privacy compliance assessment • Privacy management programme
2	- Cloud computing
3	- Mobile application development
4	- Use of public information
Chapter 5: Regulatory requirements on 'traditional' technologies and trends	
1	- Physical tracking
2	- Biometric data
3	- Encryption, Hashing and Pseudonymisation
4	- Anonymisation
5	- AdTech and surveillance marketing (ePrivacy)
6	- Privacy Enhancing Technologies
Chapter 6: Regulatory requirements on Fintech	
1	- Open API
2	- Blockchain
3	- Data analytics and Artificial Intelligence <ul style="list-style-type: none"> • Prediction that does not deliver • Creepiness • Re-identification • Discrimination • Erosion of freewill
4	- Internet of Things (IoT)

Chapter 7: Data Ethics and AI Regulation

1	<ul style="list-style-type: none"> - Data ethics <ul style="list-style-type: none"> • Worldwide calls for ethical use of data • PCPD's Guidance on the Ethical Development and Use of Artificial Intelligence • HKMA's Guiding principle on consumer protection on the use of big data / AI • HKMA's high level principles on AI • EU's Ethics guidelines for Trustworthy AI • EU's Assessment List for Trustworthy AI • The challenges of ethics
2	<ul style="list-style-type: none"> - AI regulation <ul style="list-style-type: none"> • EU's proposed AI regulation • The US approach
3	<ul style="list-style-type: none"> - The next big things <ul style="list-style-type: none"> • AdTech / cookies replacement / regulation • Dark pattern regulation

D. Recommended Readings

Essential Readings

1. OECD Privacy Guidelines 2013 – read Annex Part 1 - 4, pp. 5 – 7.
<https://legalinstruments.oecd.org/api/print?id=114&lang=en>
2. About the Office of the Privacy Commissioner for Personal Data, Hong Kong – read the whole booklet.
https://www.pcpd.org.hk/english/resources_centre/publications/files/PCPDbooklet_about_the_PCPD_201509.pdf
3. Three-minute video on the Six Data Protection Principles:
<https://youtu.be/j6fO6JVGGHg>
4. Schedule 1 (Data Protection Principles) to the Personal Data (Privacy) Ordinance (PDPO).
<https://www.elegislation.gov.hk/hk/cap486>
5. Appendix B on PDPO's PDDs, Guidance on the Ethical Development and Use of AI.
https://www.pcpd.org.hk/english/resources_centre/publications/files/guidance_ethical_e.pdf
6. HKMA Circular on Sound practices for customer data protection
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2022/20220404e1.pdf>
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and->

- [circular/2022/20220404e1a1.pdf](#)
7. Part 6A (Direct Marketing) to the PDPO.
<https://www.elegislation.gov.hk/hk/cap486>
 8. Office of the Communications Authority's The Unsolicited Electronic Messages Ordinance - An Industry Guide.
https://www.ofca.gov.hk/filemanager/ofca/common/uemo/uemo_industry_guide_e.pdf
 9. Section 33 (Cross-border data transfer) in the PDPO.
<https://www.elegislation.gov.hk/hk/cap486>
 10. Singapore Personal Data Protection Commission's Guide on Managing and Notifying Data Breaches under the Personal Data Protection Act.
<https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Other-Guides/Guide-on-Managing-and-Notifying-Data-Breaches-under-the-PDPA-15-Mar-2021.pdf?la=en>
 11. Privacy by Design and its Seven Principles.
<https://www.ipc.on.ca/wp-content/uploads/2013/09/pbd-primer.pdf>
 12. Guide to Data Protection Impact Assessment, Personal Data Protection Commission, Singapore.
<https://www.pdpc.gov.sg/Help-and-Resources/2017/11/Guide-to-Data-Protection-Impact-Assessments>
 13. Privacy Management Programme: A Best Practice Guide.
https://www.pcpd.org.hk/english/publications/files/PMP_guide_e.pdf
 14. PCPD's Cloud Computing information leaflet.
https://www.pcpd.org.hk/english/resources_centre/publications/files/IL_cloud_e.pdf
 15. PCPD's Best Practice Guide for Mobile App Development.
https://www.pcpd.org.hk/english/resources_centre/publications/files/Best_Practice_Guide_for_Mobile_App_Development_20151103.pdf
 16. PCPD's Guidance on Use of Personal Data Obtained from the Public Domain.
https://www.pcpd.org.hk/english/resources_centre/publications/files/GN_public_domain_e.pdf
 17. PCPD's Physical Tracking and Monitoring Through Electronic Devices.
https://www.pcpd.org.hk/english/resources_centre/publications/files/physical_tracking_e.pdf
 18. PCPD's Online Behavioural Tracking.
https://www.pcpd.org.hk/english/resources_centre/publications/files/online_tracking_e.pdf
 19. PCPD's Guidance on Collection and Use of Biometric Data.
https://www.pcpd.org.hk/english/resources_centre/publications/files/GN_biometric_e.pdf
 20. Information Commissioner's Opinion: Data protection and privacy expectations for online advertising proposals – read Chapters 1, 5 and 6.

- <https://ico.org.uk/media/about-the-ico/documents/4019050/opinion-on-data-protection-and-privacy-expectations-for-online-advertising-proposals.pdf>
21. Chang, Henry, Is Distributed Ledger Technology Built for Personal Data? (February 1, 2018). Journal of Data Protection & Privacy, Volume 1, Number 4, 2018, University of Hong Kong Faculty of Law Research Paper No. 2018/016
SSRN: <https://ssrn.com/abstract=3137606>
 22. The Norwegian Data Protection Authority's Report on Artificial intelligence and privacy.
https://iapp.org/media/pdf/resource_center/ai-and-privacy.pdf
 23. HKMA's Guiding principles on consumer protection aspects in respect of the use of big data analytics and artificial intelligence.
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2019/20191105e1.pdf>
 24. HKMA's High-level Principles on Artificial Intelligence.
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2019/20191101e1.pdf>

Supplementary Readings

1. Gavison, Ruth E., Privacy and the Limits of Law (May 16, 2012). The Yale Law Journal, Vol. 89, No. 3 (Jan., 1980) – read 2 and 2a, pp. 428 – 440.
<https://ssrn.com/abstract=2060957>
2. OECD Privacy Guidelines 2013.
<https://legalinstruments.oecd.org/api/print?ids=114&lang=en> – read the rest
3. Court of Appeal Judgement, Eastweek Publisher Ltd. and Privacy Commissioner for Personal Data (28 March 2000).
https://www.pcpd.org.hk/english/enforcement/judgments/files/CACV000331_1999.pdf
4. Recitals of the General Data Protection Regulation – paragraphs 1 – 173 (page L119/1 – L119/31).
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679&from=EN>
5. PCPD's Ethical Accountability Framework for Hong Kong.
https://www.pcpd.org.hk/misc/files/Ethical_Accountability_Framework.pdf

Further Readings

1. Financial Stability Board's Financial Stability Implications from FinTech
<https://www.fsb.org/wp-content/uploads/R270617.pdf>
2. PDPO exemptions under Part 8 of the PDPO
<https://www.elegislation.gov.hk/hk/cap486>
3. PCPD's booklet on "An Update on European Union General Data Protection

- Regulation 2016".
https://www.pcpd.org.hk/english/data_privacy_law/eu/files/eugdpr_e.pdf
4. Requirements of the General Data Protection Regulation – Articles 1 – 99 (page L119/32 – L119/88).
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679&from=EN>
 5. PCPD's Highlights of the Mainland's Personal Information Protection Law.
https://www.pcpd.org.hk/english/data_privacy_law/mainland_law/mainland_law.html
 6. PCPD's New Guidance on Direct Marketing.
https://www.pcpd.org.hk/english/publications/files/GN_DM_e.pdf
 7. The Unsolicited Electronic Messages Ordinance.
<https://www.elegislation.gov.hk/hk/cap593!en>
 8. The Unsolicited Electronic Messages Regulation.
<https://www.elegislation.gov.hk/hk/cap593A!en>
 9. Office of the Communications Authority's Code of Practice on Sending Commercial Electronic Messages.
<https://www.coms-auth.hk/filemanager/statement/en/upload/238/cop20131129.pdf>
 10. Guidance on Data Breach Handling and the Giving of Breach Notification, PCPD.
https://www.pcpd.org.hk/english/resources_centre/publications/files/DataBreachHandling2015_e.pdf
 11. TrustArc - Nymity Privacy and Data Governance Framework.
https://info.trustarc.com/Web-Resource-2020-01-20-Privacy-Data-Governance-Framework_TYP.html
 12. Chang, H. Privacy Regulatory Model for the Cloud: A Case Study.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2627474
 13. HKCERT's "Transaction Security of Mobile Apps in Hong Kong" Study Report.
<https://www.hkcert.org/blog/transaction-security-of-mobile-apps-in-hong-kong-study-report>
 14. HKCERT's Best Practice Guide (SSL Implementation) for Mobile App Development, HKCERT.
<https://www.hkcert.org/security-guideline/best-practice-guide-ssl-implementation-for-mobile-app-development>
 15. Privacy Guidelines: Monitoring and Personal Data Privacy at Work, PCPD.
https://www.pcpd.org.hk/english/publications/files/monguide_e.pdf
 16. UK Information Commissioner's Office Update report into AdTech and real time bidding
<https://ico.org.uk/media/about-the-ico/documents/2615156/adtech-real-time-bidding-report-201906-dl191220.pdf>
 17. Information Commissioner's Opinion: Data protection and privacy expectations for

online advertising proposals – read the rest.

<https://ico.org.uk/media/about-the-ico/documents/4019050/opinion-on-data-protection-and-privacy-expectations-for-online-advertising-proposals.pdf>

18. Open API Phase II Standards, The Hong Kong Association of Banks.
https://www.hkab.org.hk/download.jsp?isTemp=N§ion_id=5&file_name=Phase+III+Banking+Open+API+Standards.pdf
19. Chang, Henry, Responding to ethics being a data protection building block for AI (September 23, 2021). Journal of AI, Robotics and Workplace Automation, Volume 1, Number 1, 2021.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3952753
20. Chang, Henry, Ethics in Artificial Intelligence – A Disjoint Between Knowing and Acting (April 30, 2020). Journal of Data Protection & Privacy, Volume 3, Number 3, 2020, University of Hong Kong Faculty of Law Research Paper No. 2020/039.
<https://ssrn.com/abstract=3664778>
21. EU's EU Ethics Guidelines for Trustworthy AI.
https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=60651
22. EU's Assessment List for Trustworthy Artificial Intelligence (ALTAI)
https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=68342

6.6 Module 6: Artificial Intelligence and Big Data

A. Module Objective

The module aims to identify current technology trends, opportunities, challenges complexities and risks in developing Big Data (BD) & Artificial Intelligence (AI) projects and recognize the basic principles and good practice for Responsible AI.

B. Module Intended Learning Outcomes

Upon completion of this module, learners should be able to:

- Demonstrate proficiency in the advanced technical concepts, principles, and practical demonstrations of the emerging Artificial Intelligence and Big Data domains to execute problem framing and strategy analytics in conducting Fintech solution development.
- Interpret and leverage current and emerging Fintech use cases, project management techniques, and solution implementation, operation, and maintenance methodologies.
- Recognise the use and applications of Artificial Intelligence and Big Data leveraging cloud services related to data and model.

C. Syllabus

Chapter 1: Data Analytics, Artificial Intelligence and Machine Learning	
1	<ul style="list-style-type: none"> - Overview of data analytics <ul style="list-style-type: none"> • Data analytics use cases in business • Types of data analytics • Data science lifecycle
2	<ul style="list-style-type: none"> - Overview of Artificial Intelligence (AI) <ul style="list-style-type: none"> • What is artificial intelligence? • Artificial intelligence vs. machine learning • Artificial intelligence vs. data science
3	<ul style="list-style-type: none"> - Overview of Machine Learning (ML) <ul style="list-style-type: none"> • Supervised learning • Unsupervised learning • Reinforcement learning • Machine learning lifecycle
4	<ul style="list-style-type: none"> - AI implementation practices <ul style="list-style-type: none"> • Enterprise Architecture (EA) in general • AI model deployment pattern • Cloud-native design & architecture

	<ul style="list-style-type: none"> • MLOps vs. DevOps: unique challenges & solutions in AI implementation • MLOps frameworks and tools (including Data Analytics as a Service and Machine Learning as a Service)
Chapter 2: Data Model and Storage	
1	<ul style="list-style-type: none"> - Data sources and format <ul style="list-style-type: none"> • Traditional vs non-traditional data sources • Structured, unstructured and semi-structure data format • The 4Vs of Big Data
2	<ul style="list-style-type: none"> - Relational databases <ul style="list-style-type: none"> • Spreadsheets vs relational databases • Conceptual design of relational databases • Data query in relational database systems
3	<ul style="list-style-type: none"> - Data warehouses <ul style="list-style-type: none"> • OLTP vs OLAP • Database warehouse design: multidimensional data model • OLAP cube operations
4	<ul style="list-style-type: none"> - NoSQL databases <ul style="list-style-type: none"> • Types of NoSQL databases • Considerations in choosing SQL or NoSQL
5	<ul style="list-style-type: none"> - Big data storage & computing <ul style="list-style-type: none"> • Hadoop technology stack • HDFS distributed storage • MapReduce distributed processing • YARN resource management
6	<ul style="list-style-type: none"> - Cloud storage <ul style="list-style-type: none"> • Cloud vs On-Premise • Type of cloud storage • Data lake as a multi-purpose storage facility
Chapter 3: Supervised Learning and Applications	
1	<ul style="list-style-type: none"> - Overview and applications of supervised learning <ul style="list-style-type: none"> • Supervised learning workflow • Applications of classification • Applications of regression
2	<ul style="list-style-type: none"> - Regression models <ul style="list-style-type: none"> • Popular regression models • Encoding of categorical data • Evaluation metrics of regression
3	<ul style="list-style-type: none"> - Classification models <ul style="list-style-type: none"> • Popular classification models

4	<ul style="list-style-type: none"> • Distance measure & data normalization • Evaluation metrics of classification
4	<ul style="list-style-type: none"> - Ensemble learning <ul style="list-style-type: none"> • Bagging method and a sample model • Boosting method and a sample model • Stacking method
5	<ul style="list-style-type: none"> - Use cases in banking and finance
Chapter 4: Unsupervised Learning and Applications	
1	<ul style="list-style-type: none"> - Overview and applications of unsupervised learning <ul style="list-style-type: none"> • Unsupervised learning workflow • Applications of clustering • Applications of dimensionality reduction
2	<ul style="list-style-type: none"> - Clustering <ul style="list-style-type: none"> • Popular clustering models • Evaluation metrics of clustering • Cluster profiling
3	<ul style="list-style-type: none"> - Dimensionality reduction <ul style="list-style-type: none"> • The curse of dimensionality • Popular models of dimensionality reduction
4	<ul style="list-style-type: none"> - Recommendation systems <ul style="list-style-type: none"> • Recommendation systems in production • Overall architecture of a recommendation system • Popular recommendation models
5	<ul style="list-style-type: none"> - Use cases in banking and finance
Chapter 5: Deep Learning and Applications	
1	<ul style="list-style-type: none"> - Overview of deep learning <ul style="list-style-type: none"> • Deep learning vs traditional ML • Applications of Computer Vision (CV) • Applications of Natural Language Processing (NLP)
2	<ul style="list-style-type: none"> - Neural network fundamentals <ul style="list-style-type: none"> • Basic structure and major types of networks • Training a neural network • Hyperparameters in neural networks
3	<ul style="list-style-type: none"> - Computer vision – convolutional neural network <ul style="list-style-type: none"> • Computer vision tasks • CNN architecture
4	<ul style="list-style-type: none"> - Natural language processing – recurrent neural network <ul style="list-style-type: none"> • Challenges in NLP • Word embedding

5	<ul style="list-style-type: none"> • RNN based language model <ul style="list-style-type: none"> - Chatbot development <ul style="list-style-type: none"> • Selective model • Generative model • Chatbot development framework and tools
6	A use case in banking and finance
Chapter 6: Python Hands-on Lab on Data Analytics	
1	<ul style="list-style-type: none"> - Overview of Python development environment <ul style="list-style-type: none"> • What Python is/isn't for • Installation and setup • Development environment • Essential packages
2	<ul style="list-style-type: none"> - Basic syntax of Python <ul style="list-style-type: none"> • Operators • Built-in data types: tuple, list, set, dictionary • NumPy package and ndarray • Pandas package and dataframe
3	<ul style="list-style-type: none"> - Case – credit card default prediction by classification
4	<ul style="list-style-type: none"> - Case – customer segmentation by clustering
5	<ul style="list-style-type: none"> - Introduction of PyTorch <ul style="list-style-type: none"> • PyTorch installation and setup • Tensors and data import • Building models with PyTorch • Training and testing models with PyTorch
6	<ul style="list-style-type: none"> - Case – scenery image classification by CNN
Chapter 7: ML Engineering Strategies and MLOps	
1	<ul style="list-style-type: none"> - Risks and concerns of AI <ul style="list-style-type: none"> • Need large volume of training data and labels • Algorithm bias • Data drift and concept drift • Invasion of privacy • Lack of explainability • Vulnerable to adversarial attacks
2	<ul style="list-style-type: none"> - Technological developments in mitigating AI risks <ul style="list-style-type: none"> • Data augmentation • Continuous monitoring • Active learning and transfer learning • Differential privacy and secure multiparty computation • Federated learning

3	<ul style="list-style-type: none"> • Global and local interpretability techniques
4	<ul style="list-style-type: none"> - General guideline of Responsible AI <ul style="list-style-type: none"> • Fairness, reliability, accountability, transparency and interpretability, privacy and security - AI governance related regulations <ul style="list-style-type: none"> • Hong Kong: HKMA's Guiding Principles on Consumer Protection Aspects in Respect of the Use of BDAI • Hong Kong: HKMA's High-level Principle on AI • Hong Kong: PCPD's Guidance on Ethical Development and Use of AI • China: Provisions on the Scope of Necessary Personal Information for Common Types of Mobile Internet Applications 《《常見類型移動互聯網應用程式必要個人資訊範圍規定》》 China: Administrative Provisions on Algorithm Recommendation of Internet Information Services 《互聯網資訊服務演算法推薦管理規定》 • EU: General Data Protection Regulation (GDPR) and its impact on AI • EU: Ethics Guidelines for Trustworthy AI

D. Recommended Readings

Essential Readings

1. Reshaping Banking with Artificial Intelligence (HKMA white paper).
https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/White-paper_on_AI.pdf
2. Beyond the Hype: A Guide to Understanding and Successfully Implementing Artificial Intelligence within Your Business.
<https://www.ibm.com/downloads/cas/8ZDXNKQ4>
3. Motivation for MLOps
<https://ml-ops.org/content/motivation>
4. What is a Relational Database (RDBMS)?
<https://www.oracle.com/hk/database/what-is-a-relational-database/>
5. Data Warehouse Concepts.
<https://aws.amazon.com/data-warehouse/>
6. OLAP vs. OLTP: What's the Difference?
<https://www.ibm.com/cloud/blog/olap-vs-oltp>
7. What is NoSQL?
<https://www.mongodb.com/nosql-explained>
8. Hadoop Ecosystem and Their Components – A Complete Tutorial.
<https://data-flair.training/blogs/hadoop-ecosystem-components/>
9. Cloud Storage.

- <https://www.ibm.com/cloud/learn/cloud-storage>
10. What is a Data Lake?
https://aws.amazon.com/big-data/datalakes-and-analytics/what-is-a-data-lake/?nc1=f_cc
 11. Notes from the AI frontier: Applications and Value of Deep Learning (McKinsey Discussion Paper 2018).
<https://www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-applications-and-value-of-deep-learning>
 12. Machine Learning: Bridging Between Business and Data Science.
<https://www.altexsoft.com/whitepapers/machine-learning-bridging-between-business-and-data-science/>
 13. The Simple Guide to Deep Learning.
https://assets.website-files.com/5f1eaa37302cc1d5239e8c91/5f2d82c43857bb21748bf207_simple-guide-to-deep-learning.pdf
 14. Natural Language Processing (NLP).
<https://www.ibm.com/cloud/learn/natural-language-processing>
 15. Some Language Features in Python.
<https://machinelearningmastery.com/some-language-features-in-python/>
 16. NumPy and Pandas Tutorial – Data Analysis with Python.
<https://cloudxlab.com/blog/numpy-pandas-introduction/>
 17. An Introduction to Scikit-Learn: Machine Learning in Python.
<https://www.simplilearn.com/tutorials/python-tutorial/scikit-learn>
 18. Practitioners Guide to MLOps: A Framework for Continuous Delivery and Automation of Machine Learning (Google cloud white paper 2021).
<https://cloud.google.com/resources/mlops-whitepaper>
 19. MLOps Principles.
<https://ml-ops.org/content/mlops-principles>
 20. Machine Learning Operations (MLOps) Framework to Upscale Machine Learning Lifecycle with Azure Machine Learning.
<https://docs.microsoft.com/en-us/azure/architecture/example-scenario/mlops/mlops-technical-paper>
 21. What is DevOps?
https://aws.amazon.com/devops/what-is-devops/?nc1=f_cc

Supplementary Readings

1. Big Data and Machine Learning in Central Banking (BIS working paper).
<https://www.bis.org/publ/work930.htm>
2. What is Data Modeling?

- <https://www.ibm.com/cloud/learn/data-modeling>
3. Data Warehousing: Basics of Relational Vs Star Schema Data Modeling.
<https://medium.com/@daryl.ung/data-warehousing-basics-of-relational-vs-star-schema-data-modeling-75a68eeaf0e3>
4. NoSQL Databases and Its Types: A Comprehensive Guide 101.
<https://hevodata.com/learn/nosql-databases-and-its-types-a-guide/>
5. Build a Modern, Unified Analytics Data Platform with Google Cloud (Google Whitepaper 2021).
https://services.google.com/fh/files/misc/googlecloud_unified_analytics_data_platform_paper_2021.pdf
6. A Refresher on Regression Analysis.
<https://hbr.org/2015/11/a-refresher-on-regression-analysis>
7. Seven Types of Classification Algorithms.
<https://analyticsindiamag.com/7-types-classification-algorithms/>
8. Introduction to Classification Algorithms.
<https://dzone.com/articles/introduction-to-classification-algorithms>
9. Clustering in Machine Learning.
https://training.galaxyproject.org/training-material/topics/statistics/tutorials/clustering_machinelearning/tutorial.html
10. A Beginner's Guide to Dimensionality Reduction in Machine Learning.
<https://towardsdatascience.com/dimensionality-reduction-for-machine-learning-80a46c2ebb7e>
11. Five Anomaly Detection Algorithms Every Data Scientist Should Know.
<https://towardsdatascience.com/5-anomaly-detection-algorithms-every-data-scientist-should-know-b36c3605ea16>
12. Introduction to Recommender Systems.
<https://tryolabs.com/blog/introduction-to-recommender-systems>
13. Convolutional neural networks: an overview and application in radiology.
<https://insightsimaging.springeropen.com/articles/10.1007/s13244-018-0639-9>
14. Natural Language Processing (NLP): What it is and Why it Matters.
https://www.sas.com/en_us/insights/analytics/what-is-natural-language-processing-nlp.html
15. The Ultimate Guide To Different Word Embedding Techniques In NLP.
<https://www.kdnuggets.com/2021/11/guide-word-embedding-techniques-nlp.html>
16. Learn Python Programming.
<https://www.programiz.com/python-programming>
17. Learn Python - Free Interactive Python Tutorial.
<https://www.learnpython.org/>
18. PyTorch Tutorial: How to Develop Deep Learning Models with Python.

- <https://machinelearningmastery.com/pytorch-tutorial-develop-deep-learning-models/>
19. A Critical Overview of AutoML Solutions.
<https://medium.com/analytics-vidhya/a-critical-overview-of-automl-solutions-cb37ab0eb59e>
 20. Choosing the Best MLOps Platform: a Comprehensive Comparison of MLOps Platforms.
<https://valohai.com/mlops-platforms-compared/>
 21. Best End-to-End MLOps Platforms: Leading Machine Learning Platforms That Every Data Scientist Need to Know.
<https://neptune.ai/blog/end-to-end-mlops-platforms>

Further Readings

1. 2022 AI Index Report (Stanford University).
<https://aiindex.stanford.edu/report/>

6.7 Module 7: Distributed Ledger Technology (DLT)

A. **Module Objective**

The module aims to introduce distributed ledger technology, smart contracts, and their latest applications in financial institutions.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Demonstrate proficiency in the advanced technical concepts, principles, and practical demonstrations of the emerging DLT domains to execute problem framing and strategy analytics in conducting Fintech solution development.
- Interpret and leverage current and emerging Fintech use cases, project management techniques, and solution implementation, operation, and maintenance methodologies.

C. **Syllabus**

Chapter 1: Distributed Ledger Technology Overview and Trend	
1	- What is distributed ledger technology (DLT)? <ul style="list-style-type: none"> • Definition of DLT • Features of DLT
2	- Comparison of DLT with other databases <ul style="list-style-type: none"> • Important differences between DLT and other databases • Advantage of DLT
3	- History of DLT <ul style="list-style-type: none"> • First application of DLT: Bitcoin • Differences between Bitcoin and other attempts of digital currency
4	- Current state of the field <ul style="list-style-type: none"> • Cryptocurrency use case • Cryptocurrency industry including mining • Difference between cryptocurrency and other currency
Chapter 2: Distributed Ledger Technology Fundamentals	
1	- Basics of cryptography in DLT <ul style="list-style-type: none"> • Overview of cryptography used in DLT • How cryptography ensure immutable data in DLT
2	- Hash function <ul style="list-style-type: none"> • Definition of hash function • Important features of hash function • Use of hash function in DLT and other scenario

3	- Public key encryption <ul style="list-style-type: none"> • Definition of public key encryption • Features of public key encryption • Use of public key encryption in DLT
4	- Decentralized digital identity <ul style="list-style-type: none"> • Definition of decentralized digital identity • How to use public key encryption to achieve decentralized digital identity • Cryptocurrency storage and custodian
5	- Transactions <ul style="list-style-type: none"> • Definition of transactions in DLT • Example of cryptocurrency transactions
6	- Block building and consensus mechanism <ul style="list-style-type: none"> • Block structure • Merkle tree • Block building process • Consensus mechanism: proof of work, proof of stake • Forks
Chapter 3: Smart Contracts	
1	- What is a smart contract? <ul style="list-style-type: none"> • Definition of smart contract • Smart contract features • History of smart contract
2	- Advantage of smart contracts <ul style="list-style-type: none"> • Important differences between smart contract and traditional contracts • Advantage and disadvantage of using smart contracts
3	- Applications of smart contracts <ul style="list-style-type: none"> • Application of smart contracts in DLT • Immaturity of the DLT technology • Technical vulnerabilities related to security • Example of smart contracts
4	- Smart contract examples: Lightning network <ul style="list-style-type: none"> • Multi-signature output; hashed secret and time-lock • Opening payment channels • Updating channel balance • Creating a network
Chapter 4: DLT Applications in Financial Institutions	
1	- Pros and Cons of using DLT <ul style="list-style-type: none"> • Distinguishing characteristics of DLT • Advantage and disadvantage of using DLT

2	- DLT applications in money transfer and payment <ul style="list-style-type: none"> • Background of intra-bank, inter-bank and international money transfer • Ripple as a money transfer service • Other DLT-based money transfer services • DLT in payment services
3	- DLT applications in securities <ul style="list-style-type: none"> • Discussion of DLT application in securities industry • Project Ubin (securities settlement Dvp) • Australian Stock Exchange's DLT application (CHESS) • HKEX's Synapse
4	- Other DLT applications in financial institutions <ul style="list-style-type: none"> • Application of DLT in derivative market • Application of DLT in insurance industry • Application of DLT in auditing
Chapter 5: Token Offering	
1	- What is an Initial Coin Offering? <ul style="list-style-type: none"> • Definition of ICO • Typical structure of ICO • Typical token sale disclosure • Determinants of token sale success
2	- Advantage and Disadvantage of ICO <ul style="list-style-type: none"> • Advantage and disadvantage of ICO from issuer's perspective • ICO's role in start-up life-cycle and ways of working • Advantage and disadvantage of ICO from investors/users' perspective
3	- Tokenomics <ul style="list-style-type: none"> • Discuss using tokens can support the development of new business models • How tokens can align incentives of users and project managers
4	- Securities Token Offering – Regulated ICOs <ul style="list-style-type: none"> • Laws and regulations related to ICOs • Enforcement actions against ICOs
5	- Example in Token Offering <ul style="list-style-type: none"> • Examples of ICOs • ICO and VC-backed Blockchain startups • Filecoin ICO case
Chapter 6: DLT Project Management	
1	- Project objectives and planning <ul style="list-style-type: none"> • Determine the right project for DLT • Define project objectives

2	<ul style="list-style-type: none"> • Deutsche Bank: Pursuing Blockchain Opportunity (A) case • Project Genesis: Advantage of tokenized securities
3	<ul style="list-style-type: none"> - Vendor selection management <ul style="list-style-type: none"> • Popular DLT structures including DLT consortiums • Comparison of different DLT consortiums, their underlying technologies and key focus areas: Hyperledger, R3 Corda, Ethereum • DLT selection in Project Genesis • Stablecoin
4	<ul style="list-style-type: none"> - Milestone monitoring and reporting <ul style="list-style-type: none"> • Reporting of SWIFT DLT proof-of-concept • Reporting of Project Genesis
4	<ul style="list-style-type: none"> - Operation and maintenance <ul style="list-style-type: none"> • Operational issues to consider in DLT projects • Regulatory challenges • Workflows and payment rail • Stablecoins • DLT project design: Information sharing, decentralized nature, and governance

D. Recommended Readings

Essential Readings

1. Bitcoin: A Peer-to-Peer Electronic Cash System (Satoshi Nakamoto, 2009).
<https://bitcoin.org/bitcoin.pdf>
2. Some Simple Economics of the Blockchain, by Christian Catalini and Joshua Gans.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2874598
3. Bitcoin and Cryptocurrency Technologies, by Narayanan, Bonneau, Felten, Miller, Goldfeder – Preface, and Chapters 1-3 and 5.
https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf
4. Blockchain Technology: Beyond Bitcoin, Applied Innovation Review 2016.
<https://j2-capital.com/wp-content/uploads/2017/11/AIR-2016-Blockchain.pdf>
5. Cryptocurrencies: Investment, Money, or Gamble? (A) (Required Case)
<https://hbsp.harvard.edu/product/W91C19-PDF-ENG>
6. The idea of smart contracts (Nick Szabo).
<https://nakamoinstitute.org/the-idea-of-smart-contracts/>
7. The Bitcoin Lightning Network summary.
<https://lightning.network/lightning-network-summary.pdf>
8. The Bitcoin Lightning Network white paper.
<https://lightning.network/lightning-network-paper.pdf>

9. An Introduction to Smart Contracts and Their Potential and Inherent Limitations by Stuart Levin on Harvard Law School Forum on Corporate Governance.
<https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/>
10. Project Ubin Phase 3: Delivery versus Payment on DLT.
<https://www.mas.gov.sg/-/media/MAS/ProjectUbin/Project-Ubin-DvP-on-Distributed-Ledger-Technologies.pdf?la=en&hash=2ADD9093B64A819FCC78D94E68FA008A6CD724FF>
11. Corporate Governance and Blockchains by David Yermack, Review of Finance, Vol. 21 Issue 1, 2017.
<https://academic.oup.com/rof/article/21/1/7/2888422>
12. Toward Blockchain-Based Accounting and Assurance by Jun Dai and Miklos Vasarhelyi, Journal of Information System, Vol. 31 Issue 3, 2017.
<https://meridian.allenpress.com/jis/article-abstract/31/3/5/75785/Toward-Blockchain-Based-Accounting-and-Assurance>
13. Whitepaper on Distributed Ledger Technology by ASTRI.
https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/Whitepaper_On_Distributed_Ledger_Technology.pdf
14. Whitepaper 2.0 on Distributed Ledger Technology by HKMA.
<https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/infrastructure/20171025e1.pdf>
15. Filecoin's Initial Coin Offering: Using Blockchain to Decentralise Storage (Required Case).
<https://hbsp.harvard.edu/product/NTU182-PDF-ENG>
16. Basic Attention Token White Paper.
<https://basicattentiontoken.org/static-assets/documents/BasicAttentionTokenWhitePaper-4.pdf>
17. Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sales by Sabrina T Howell, Marina Niessner, David Yermack, Review of Financial Studies, Vol. 33 Issue 9, 2020.
<https://academic.oup.com/rfs/article/33/9/3925/5610546>
18. Statement on Initial Coin Offerings by SFC HK.
<https://www.sfc.hk/en/News-and-announcements/Policy-statements-and-announcements/Statement-on-initial-coin-offerings>
19. Statement on Security Token Offerings by SFC HK.
<https://www.sfc.hk/en/News-and-announcements/Policy-statements-and-announcements/Statement-on-Security-Token-Offerings>
20. Understanding initial coin offering: A new means of raising funds based on Blockchain by European Parliament.

- [https://www.europarl.europa.eu/Reg-DATA/etudes/BRIE/2021/696167/EPRS_BRI\(2021\)696167_EN.pdf](https://www.europarl.europa.eu/Reg-DATA/etudes/BRIE/2021/696167/EPRS_BRI(2021)696167_EN.pdf)
21. Deutsche Bank: Pursuing Blockchain Opportunities (A) (Required Case)
<https://hbsp.harvard.edu/product/817100-PDF-ENG>
 22. Project Genesis, Report 1, BIS/HKMA.
https://www.bis.org/publ/othp43_report1.pdf
 23. Project Genesis, Report 2, BIS/HKMA/Liberty Consortium.
https://www.bis.org/publ/othp43_report2.pdf
 24. Project Genesis, Report 3, BIS/HKMA/Digital Assets.
https://www.bis.org/publ/othp43_report3.pdf
 25. SWIFT gpi real-time Nostro Proof of Concept.
<https://www.swift.com/swift-resource/167181/download>

Supplementary Readings

1. Mastering Bitcoin by Andreas M. Antonopoulos (Chapter 1-2, 4-6, 9-10 and 12).
<https://github.com/bitcoinbook/bitcoinbook>
2. Bitcoin: Economics, Technology, and Governance by Böhme, Rainer, Nicolas Christin, Benjamin Edelman, and Tyler Moore, Journal of Economic Perspectives 29, no. 2, 2015.
<https://www.aeaweb.org/articles?id=10.1257/jep.29.2.213>
3. Bitcoin and Cryptocurrency Technologies (Chapters 4, 6-10).
https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf
4. Risks and Returns of Cryptocurrency, by Yukun Liu and Aleh Tsyvinski, Review of Financial Studies, Vol. 34 Issue 6, 2021.
<https://academic.oup.com/rfs/article/34/6/2689/5912024>
5. Project Ubin Phase 3: Delivery versus Payment on DLT.
<https://www.mas.gov.sg/-/media/MAS/ProjectUbin/Project-Ubin-DvP-on-Distributed-Ledger-Technologies.pdf?la=en&hash=2ADD9093B64A819FCC78D94E68FA008A6CD724FF>
6. Whitepaper 2.0 on Distributed Ledger Technology (Annex) by HKMA.
<https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/infrastructure/20171025e1a1.pdf>
7. Distributed Ledger Technology: Implications of Blockchain for the Securities Industry by FINRA.
https://www.finra.org/sites/default/files/FINRA_Blockchain_Report.pdf
8. The Role of Disclosure and Information Intermediaries in an Unregulated Capital Market: Evidence from Initial Coin Offerings by Bourveau, De George, Ellahie and Maciocchi, Journal of Accounting Research forthcoming.
<https://onlinelibrary.wiley.com/doi/abs/10.1111/1475-679X.12404>

9. Securities and Exchange Commission Release No. 81207.
<https://www.sec.gov/litigation/investreport/34-81207.pdf>
10. ASX's Replacement for CHESSE for Equity Post-Trade Services: Business Requirement. <https://www.asx.com.au/documents/public-consultations/ASX-Consultation-Paper-CHESSE-Replacement-19-September-2016.pdf>
11. CHESSE Replacement: New Scope and Implementation Plan.
<https://www.asx.com.au/documents/public-consultations/chess-replacement-new-scope-and-implementation-plan.pdf>
12. Distributed Ledger Technology in Experiments in Payments and Settlements, by IMF.
<https://www.imf.org/en/Publications/fintech-notes/Issues/2020/06/25/Distributed-Ledger-Technology-Experiments-in-Payments-and-Settlements-49251>
13. The Dai Stablecoin System Whitepaper.
<https://makerdao.com/whitepaper/Dai-Whitepaper-Dec17-en.pdf>

Further Readings

1. Is Bitcoin Really Untethered? By John M. Griffin and Amin Shams, Journal of Finance Vol. 75 Issue 4, 2020.
<https://onlinelibrary.wiley.com/doi/full/10.1111/jofi.12903>
2. Getting off the Ground: The Case of Bitcoin by William Luther, Journal of Institutional Economics, 2019.
<https://www.cambridge.org/core/services/aop-cambridge-core/content/view/08F266520BB3C5FDB1C346681550FF1C/S1744137418000243a.pdf/getting-off-the-ground-the-case-of-bitcoin.pdf>
3. Banking on Stone Money Ancient Antecedents to Bitcoin by Fitzpatrick and McKeon, Economic Anthropology 2020.
<https://anthrosource.onlinelibrary.wiley.com/doi/full/10.1002/sea2.12154>
4. Hashcash – A Denial of Service Counter-Measure, Adam Back, 2002.
<https://nakamotoinstitute.org/static/docs/hashcash.pdf>
5. Blockchain without Waste: Proof-of-Stake, by Fahad Saleh, Review of Financial Studies, Vol. 34 Issue 3, 2021.
<https://academic.oup.com/rfs/article/34/3/1156/5868423>
6. Bitcoin and Cryptocurrency Technologies (Chapters 10 and 11).
https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf
7. Mastering Bitcoin (Chapter 7).
<https://github.com/bitcoinbook/bitcoinbook>
8. Blockchain Technology Overview by NIST.
<https://nvlpubs.nist.gov/nistpubs/ir/2018/NIST.IR.8202.pdf>
9. Blockchain Disruption and Smart Contracts, by Lin William Cong and Zhiguo He, Review of Financial Studies, Vol. 32 Issue 5, 2019.

- <https://academic.oup.com/rfs/article/32/5/1754/5427778>
10. Smart Contract and the Cost of Inflexibility by Jeremy Sklaroff, University of Pennsylvania Law Review, 2017.
https://scholarship.law.upenn.edu/penn_law_review/vol166/iss1/5/
 11. TradeIX: Blockchain-Enabled Trade Finance in Global Supply Chains.
<https://hbsp.harvard.edu/product/W20650-PDF-ENG>
 12. Inthanon-LionRock Leveraging Distributed Ledger Technology to Increase Efficiency in Cross-Border Payments.
https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/Report_on_Project_Inthanon-LionRock.pdf
 13. Distributed Ledger Technology in Payment Clearing and Settlement by BIS.
<https://www.bis.org/cpmi/publ/d157.htm>
 14. On the Future of Securities Settlement by BIS.
https://www.bis.org/publ/qtrpdf/r_qt2003i.pdf
 15. Position paper Regulation of virtual asset trading platforms by SFC HK.
<https://www.sfc.hk/-/media/EN/files/ER/PDF/20191106-Position-Paper-and-Appendix-1-to-Position-Paper-Eng.pdf>
 16. Initial Coin Offerings, Speculation, and Asset Tokenization, by Jingxing Gan, Gerry Tsoukalas and Serguei Netessine, Management Science, Vol. 67 Issue 2, 2021.
<https://pubsonline.informs.org/doi/abs/10.1287/mnsc.2020.3796>
 17. Digital Tulips? Returns to Investors in Initial Coin Offerings, by Hugo Benedetti and Leonard Kostovetsky, Journal of Corporate Finance, Vol. 66, 2021.
<https://www.sciencedirect.com/science/article/pii/S0929119920302303>
 18. Project Ubin: SGD on Distributed Ledger.
<https://www.mas.gov.sg/-/media/MAS/ProjectUbin/Project-Ubin--SGD-on-Distributed-Ledger.pdf>
 19. Project Ubin Phase 2 Report: Re-imagining Real-time Gross Settlement System Using Distributed Ledger Technologies.
<https://www.mas.gov.sg/-/media/MAS/ProjectUbin/Project-Ubin-Phase-2-Reimagining-RTGS.pdf?la=en&hash=02722F923D88DE83C35AF4D1346FDC2D42298AE0>
 20. Jasper-Ubin Design Paper: Enabling Cross-Border High Value Transfer using DLT.
<https://www.mas.gov.sg/-/media/MAS/ProjectUbin/Jasper-Ubin-Design-Paper.pdf?la=en&hash=437222C94FD39314FB4C685EA31FC3AAA5CA5DA1>
 21. Project Ubin Phase 5: Enabling Broad Ecosystem Opportunities.
<https://www.mas.gov.sg/-/media/MAS/ProjectUbin/Project-Ubin-Phase-5-Enabling-Broad-Ecosystem-Opportunities.pdf>
 22. Investigating the Impact of Global Stablecoins, by BIS.
<https://www.bis.org/cpmi/publ/d187.htm>

6.8 Module 8: Open Banking and Application Programming Interface (API)

A. **Module Objective**

The module aims to make learners understand Open Banking Strategy and APIs Operations, and Design Innovative Banking Solutions and API Applications for Future Banking .

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Demonstrate proficiency in the advanced technical concepts, principles, and practical demonstrations of the emerging API domains to execute problem framing and strategy analytics in conducting framework and gateway management, API programming, and Fintech solution development.
- Interpret and leverage current and emerging Fintech use cases, project management techniques, and solution implementation, operation, and maintenance methodologies.

C. **Syllabus**

Chapter 1: Hong Kong Open API Framework and Ecosystem	
1	- Open Banking and Open API
2	- Worldwide development - UK, EU, Singapore, Australia, Japan and China
3	- HKMA's Open API Framework <ul style="list-style-type: none"> • The HKMA's four phases and their timelines • The HKAB common baseline for TSPs + examples • The HKAB phase III standards (Technical, User experience, Customer authentication, Data, InfoSec and Operation) + expected examples
4	- Open API ecosystem <ul style="list-style-type: none"> • Repository - Science Park Data Studio • APIX Open API Exchange Platform • Sandbox arrangement
Chapter 2: Open Innovation, Open Source Intelligence, Open Architecture	
1	- Understanding the Glocal (Global and Local) Open Ecosystem
2	- Open Innovation, Open Collaboration, Open Competition – Crowdsourcing (talents)
3	- Open Source “Financial” Intelligence, IoT, Big Data Analytics
4	- Open Architecture, P2P, Distributed, Sharing Economy
5	- Open Source Software, CopyLeft, Open Algorithms

6	- "Open": the Disruptor; the Game Changer
Chapter 3: Open Government, Open Banking, Open API	
1	- Hong Kong SAR Government's FinTech Initiatives
2	- Open Government – Directives and Policies
3	- Open Government – Open Data Portal and APIs
4	- API Centric Financial Hub – Hong Kong? London?
5	- Planning the "Open" and "Open Innovation" Strategies in Banking and Finance
6	- Digital Banking powered by an API led Architecture
7	- Planning the "Open" and "Open Innovation" Strategies as part of the Global Fintech Landscape
Chapter 4: API Management, DLT, DeFi and DAO	
1	- API – SOAP, REST, GraphQL
2	- API Security Best Practices
3	- API Management
4	- Case Analysis – Transformation of Banking and Payments Through Open APIs
5	- Case Study – Koho Financial Inc.: Facing a New Banking Era
Chapter 5: Case Analysis: Open Banking, APIs, DLT, FPS (Faster Payment System) and DCEP (Digital Currency Electronic Payment)	
1	- Case Study – JPMorgan Chase & Co: Open Banking
2	- FPS (Faster Payment System)
3	- DCEP (Digital Currency Electronic Payment), CBDC (Central Bank Digital Currency), eHKD
4	- Can we integrate FPS, DCEP, CBDC, eHKD, Open Banking APIs and DLTs?
5	- Case Analysis APIs – DLT Interoperability
6	- Case Analysis – Nova Ecosystem Project 2019
Chapter 6: Potential API Applications for Future Banking	
1	- Quick review of the four phases in Hong Kong
2	- API (hands on session)
3	- Understand the Pros and Cons in different software / API development models
4	- Monetization of Open Banking and APIs
Chapter 7: POC Presentations: Open Banking API Phase 3 and 4	
1	- After learning from Chapter 5 & 6, API Group Presentations on proposed Phase 3 and 4 innovative banking model(s) and implementations

D. Recommended Readings

Essential Readings

1. HKMA's Open API Framework for the Hong Kong Banking Sector.
<https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2018/20180718e5a2.pdf>
2. HKAB's Open API Framework for the Hong Kong Banking Sector Phase II Common Baseline. https://www.hkab.org.hk/download.jsp?isTemp=N§ion_id=5&file_name=HKAB-Phase+II+Common+Baseline.pdf
3. HKAB's Phase III Banking Open API Standards. https://www.hkab.org.hk/download.jsp?isTemp=N§ion_id=5&file_name=Phase+III+Banking+Open+API+Standards.pdf
4. Problem Framing.
https://edtechbooks.org/id/problem_framing
<https://designsprint.academy/about-problem-framing/>
<https://www.atlassian.com/team-playbook/plays/problem-framing>
<https://itk.mitre.org/toolkit-tools/problem-framing/>
5. Agility, SCRUM and other software development methodologies in Innovative Management.
<https://www.management-issues.com/opinion/7249/developing-agility/>
<https://www.cprime.com/resources/what-is-agile-what-is-scrum/>
6. Talent Crowdsourcing.
<https://blog.shrm.org/sasia/blog/how-crowdsourcing-can-enhance-the-quality-of-talent-acquisition-strategy>
7. Open Banking API use cases.
<https://subaio.com/the-5-best-use-cases-of-open-banking/>
<https://nordigen.com/en/case-studies/>
<https://www.openbankproject.com/>
8. DLT Governance Whitepaper.
<https://www.dtcc.com/~media/Files/Downloads/WhitePapers/DLT-Governance-Whitepaper.pdf>
9. API Governance:
<https://www.digitalml.com/api-governance-best-practices/>
10. DCEP/CBDC/eHKD
<https://boxmining.com/dcep/>
<https://www.rieti.go.jp/en/china/19122701.html>
“e-HKD_A_Policy_and_Design_Perspective”, HKMA
<https://www.hkma.gov.hk/eng/news-and-media/press-releases/2022/04/20220427-3/>
“eHKD: A Technical Perspective”, HKMA

- <https://www.hkma.gov.hk/eng/news-and-media/press-releases/2021/10/20211004-3/>
11. Why Now is the time for "Open Innovation" by L. Dahlander and M. Wallin, HBR Jun 05, 2020.
<https://store.hbr.org/product/why-now-is-the-time-for-open-innovation/h05o0i?sku=H05O0I-PDF-ENG>
 12. Open Innovation.
<https://www.ennomotive.com/open-innovation>
 13. Open Innovation Success with Procter & Gamble.
<https://www.ideaconnection.com/open-innovation-success/An-Example-of-Open-Innovation-Success-with-Procter-Ga-00641.html>
 14. Open Data, Open Government.
<https://open.canada.ca/en/open-data>
<https://data.gov.sg/>
 15. OGCIO Open Data Plan.
https://www.ogcio.gov.hk/en/about_us/annual_open_data_plans/
 16. Open vs Closed Architecture Technology Systems.
<https://www.youtube.com/watch?v=A8Bp-WEndww>
<https://www.youtube.com/watch?v=7mMToRIAXs>
 17. Value Chain in Banking.
https://ebrary.net/11786/business_finance/value_chain_banking
<https://notesmatic.com/value-chain-analysis-of-the-banking-industry/>
 18. Punyia, J., and Austin, R.D., "JP Morgan Chase & Co - Opening Banking", Harvard Business Review 2021.
<https://store.hbr.org/product/jpmorgan-chase-co-open-banking/W21252>
 19. Chen, L., Wang, X., Yau, E., and Ryoo, J.H., "Koho Financial Inc. - Facing a New Banking Era", Harvard Business Review 2021.
<https://store.hbr.org/product/koho-financial-inc-facing-a-new-banking-era/W21040>
 20. Open Banking Strategy.
<https://www.mulesoft.com/lp/whitepaper/api/open-banking-platform>
 21. API Management.
<https://www.oreilly.com/library/view/data-management-at/9781492054771/ch04.html>
<https://docs.broadcom.com/doc/api-strategy-and-architecture-a-coordinated-approach>
 22. Managing API lifecycle.
<https://www.mulesoft.com/ty/ebook/api-lifecycle-management>
 23. API Authentication Methods.
<https://blog.cloud-elements.com/5-keys-building-integrations-2>
<https://apiacademy.co/2021/04/the-most-common-api-authentication-methods/>
 24. API Security Issues.

- <https://frontegg.com/blog/api-security-checklist>
<https://www.templarbit.com/blog/2018/01/10/api-security-checklist/>
<https://salt.security/blog/api-security-checklist>
25. Open Banking API Implementation.
<https://wso2.com/articles/2019/08/implementing-a-successful-open-banking-architecture/>
26. HSBC, BEA, BoC, etc. API portal.
<https://developer.hsbc.com.hk/#/home>
<https://www.hkbea.com/html/en/bea-open-api.html>
<https://www.bochk.com/en/more/openbankingcollaboration.html> <https://sandboxportal.apix.com.hk/jetco/sb/>
27. HKeX API.
https://www.hkex.com.hk/Services/Trading/Derivatives/Infrastructure/HKATS?sc_lang=en
28. CME APIs.
<https://www.cmegroup.com/market-data/datamine-api.html>
29. Binance API.
<https://www.binance.com/en/support/faq/360002502072>
<https://github.com/binance/binance-spot-api-docs/blob/master/rest-api.md>
30. Lab exercise materials. [To be distributed in Class 6]
31. How to monetize APIs in the emerging world of open banking?
<https://www.payveris.com/media/1210/api-monetization-webinar-final-05132020.pdf>
32. Borysowich, C., "The Future of Open Banking: How to monetize your bank's APIs", CAPCO, 2017.
<https://www.capco.com/intelligence/capco-intelligence/the-future-of-open-banking-how-to-monetize-your-banks-api>
33. API monetization: making a success of Open Banking.
<https://thepaypers.com/expert-opinion/api-monetisation-making-a-success-of-open-banking--1245590>

Supplementary Readings

1. HKMA's Open API thematic page
<https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/open-application-programming-interface-api-for-the-banking-sector/>
2. Consultancy study on The Next Phase of the Banking Open API Journey
https://www.hkma.gov.hk/media/eng/doc/key-functions/ifc/fintech/The_Next_Phase_of_the_Banking_Open_API_Journey.pdf
3. Challenges of DLT enabled Scalable Governance and the Role of Standards" by G. Benedict, CIO Reserve Bank of Australia.

- https://www.riverpublishers.com/journal_read_html_article.php?j=JICTS/7/3/1
4. Blockchain Governance.
<https://www.tandfonline.com/doi/full/10.1080/10580530.2020.1720046>
5. Managing Talents/Millennials in the Workplace.
<https://www.greatplacetowork.com/resources/blog/7-research-backed-ways-to-effectively-manage-millennials-in-the-workplace>
6. API and Copyright issues.
<https://arstechnica.com/tech-policy/2021/04/how-the-supreme-court-saved-the-software-industry-from-api-copyrights/>
<https://www.wired.com/insights/2014/05/non-apocalypse-apis-copyright-fair-use/>
7. Copyleft.
<https://www.gnu.org/licenses/copyleft.en.html>
8. Copyleft: The Rise of Open Source Software Licensing.
<https://snyk.io/learn/what-is-copyleft-license/>
9. Multi-tier Architecture.
<https://www.ibm.com/cloud/learn/three-tier-architecture>
10. Open Banking Whitepaper.
<https://www.lintinfotech.com/wp-content/uploads/2020/06/Open-Banking.pdf>
11. UK Open Banking API standards.
<https://standards.openbanking.org.uk/>

Further Readings

1. Hong Kong Open API Exchange Platform (APIX).
<https://www.apix.com.hk/>
2. Hong Kong Science and Technology Park's Data Studio.
<http://datastudio.hkstp.org/>
3. Government of Canada Standards on APIs.
<https://www.canada.ca/en/government/system/digital-government/modern-emerging-technologies/government-canada-standards-apis.html>
4. Open Source Community.
<https://github.com/open-source>

6.9 Module 9: Business Strategy and Marketing

A. **Module Objective**

The module aims to introduce business and marketing strategies for effective Fintech adoption.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Drive Fintech adoption through effective means of value proposition, strategic banking roadmap of Fintech implementation, and knowledge of the future Fintech landscape.
- Manage the development of business case for initiating a Fintech project, resourcing, research, and analysis, including modelling techniques to evaluate the impact of Fintech.

C. **Syllabus**

Chapter 1: Fintech: Disruptive in Financial Services	
1	- Fintech as a form of Disruptive Innovation <ul style="list-style-type: none"> • How is Fintech similar to or different from other disruptive innovations? • What is necessary for an innovation to become disruptive industry • Fintech innovation potential for finance industry disruption • World Economic Forum Report on Blockchain as disruptive innovation • Blockchain as a potentially disruptive innovation in finance
Chapter 2: Fintech: Understanding Competitive Landscape	
1	- Fintech: Forces Driving Transformation <ul style="list-style-type: none"> • Fintech results experienced to date are mixed • Eight forces that have potential to transform financial services • Fintech potential transformation large, but results will be mixed
Chapter 3: Fintech: Impact on the Future of Banking	
1	- Fintech: Impacts on the future of banking <ul style="list-style-type: none"> • Fintech: Five key capabilities or technologies to understand • Fintech: Implications for economies of scale and scope in banking
Chapter 4: Basic Concepts on Business and Innovation Strategy	
1	- Business and innovation strategies
Chapter 5: Strategic Framework for Fintech Implementations	

1	- Fintech survey of alternative strategies
2	- What is needed for Fintech leadership
3	- Best practices to develop Fintech strategy
4	- Focus on customer platform not product
5	- Platform strategies are very different
6	- Traditional banks as digital ecosystems
Chapter 6: Innovation Models for Effective Fintech Adoption	
1	- Innovation models for Fintech in banks
2	- Innovation adoption framework
3	- Choosing an innovation adoption model
4	- Innovation model for working with partners
Chapter 7: Engagement Models for Fintech Implementation	
1	- Engagement models for Fintech implementation
Chapter 8: Fintech Marketing with Value Proposition Approach	
1	- Developing an effective value proposition
2	- Transform banking products for Fintech
3	- Design Fintech products from ground up
Chapter 9: Customer-centric Approaches for Fintech Marketing	
1	- Customer-centric marketing strategy
2	- Academic research on Fintech experiences
3	- Becoming customer-centric in Fintech
4	- Five steps for a customer-centric business
Chapter 10: Alternative Fintech Marketing Strategies and Tactics	
1	- Marketing strategies and tactics for Fintech
2	- Why Fintech is different from traditional product marketing
3	- Gamification in Fintech marketing
4	- Referral, affiliate or influencer marketing
5	- Experiential marketing
6	- Partnership marketing
7	- Community marketing
8	- Creative and innovation branding
9	- Content marketing and media production
10	- Implementing Fintech marketing plan
Chapter 11: Identify Skill Gaps with Supply-Demand Analysis	

1	- Identity skill gaps: Supply-demand analysis
2	- Identify future skills needs expectations
3	- Major skill gaps based on supply vs demand
4	- Technology and data skills gap for future
Chapter 12: Sound Practices in Fintech Talent Management	
1	- Sound practices in talent management
2	- Reskilling to empower workers and fill gaps
3	- Redeployment to develop skills and fill gaps
4	- Recruitment to attract skills to fill gaps
5	- Attracting overseas (or mainland) talents to fill gaps
6	- Retrenchment in order to address skills gap
Chapter 13: Sound Management of Fintech Operational Risks	
1	- Potential Fintech-related operational risks
2	- Basel Committee's principles for managing operational risks for large financial firms
3	- Operational risks identified in Basel Report
4	- Systematic Operational Risk with Fintech
5	- Idiosyncratic Fintech operational risks
6	- Increased outsourcing risks with Fintech

D. Recommended Readings

Essential Readings

1. PWC "Blurred lines: How FinTech is shaping Financial Services," Global FinTech Report 2016.
https://www.pwc.com/il/en/home/assets/pwc_fintech_global_report.pdf
2. World Economic Forum. "The future of financial infrastructure: An ambitious look at how blockchain can reshape financial services," Part of the Future of Financial Services Series August 2016."
https://www3.weforum.org/docs/WEF_The_future_of_financial_infrastructure.pdf
3. Deloitte "Beyond fintech: Eight forces that are shifting the competitive landscape", 2017. <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-beyond-fintech-eight-forces-that-are-shifting-the-competitive-landscape.pdf>
4. Nakaso, H. "FinTech – Its Impacts on Finance, Economies and Central Banking," Remarks at the University of Tokyo – Bank of Japan Joint Conference in Tokyo on "FinTech and the Future of Money" 2016.

- <https://www.bis.org/review/r161214a.pdf>
5. Boot, A. W. A. "The Future of Banking: From Scale and Scope Economies to Fintech," *European Economy*, 2017 (2), 77-95.
<https://european-economy.eu/2017-2/the-future-of-banking-from-scale-scope-economies-to-fintech/?did=2048>
 6. Basel Committee on Banking Supervision "Sound Practices Implications of fintech developments for banks and bank supervisors". February 2018.
<https://www.bis.org/bcbs/publ/d415.pdf>
 7. Heubel, M "What is Strategy? Definition, Components & Examples Explained," 2021.
<https://consulterce.com/business-strategy/>
 8. Pisano, G.P. "You Need an Innovation Strategy," *Harvard Business Review* 2015.
<https://store.hbr.org/product/you-need-an-innovation-strategy/r1506b?sku=R1506B-PDF-ENG>
 9. Kylliäinen, J. "Innovation Strategy – What is it and how to develop one?," *The Viima Blog*, 2018.
<https://www.viima.com/blog/innovation-strategy>
 10. KPMG Spark Blog: The Four Stages of Startups
<https://www.kpmgspark.com/blog/the-4-stages-of-startups>
 11. KPMG "Forging the future – How financial institutions are embracing fintech to evolve and grow?" 2017.
<https://assets.kpmg/content/dam/kpmg/xx/pdf/2017/10/forging-the-future-global-fintech-study.pdf>
 12. EY "A vision for platform-based banking." 2018.
https://assets.ey.com/content/dam/ey-sites/ey-com/en_us/topics/financial-services/ey-a-vision-for-platform-based-banking.pdf
 13. EY "Unleashing the potential of FinTech in banking" 2017.
https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/banking-and-capital-markets/ey-unleashing-the-potential-of-fin-tech-in-banking.pdf
 14. Georgas-Tellefsen, M.E. and Gibson, M. "4 Crucial Steps to Transform Banking Products for a Fintech World." *Capital Performance Group, The Financial Brand*, 2021.
<https://thefinancialbrand.com/89693/bank-account-product-design-marketing-segment-pricing/>
 15. Epsilon Marketing "How to create a successful fintech marketing strategy." 2021.
<https://www.epsilon.com/us/insights/blog/how-to-create-a-successful-fintech-marketing-strategy>
 16. Barbu, C.M.; Florea, D.L.; Dabija, D. C.; Barbu, M.C.R. "Customer Experience in Fintech," *Journal of Theoretical and Applied Electronic Commerce Research* 2021, 16, 1415–1433.

- <https://www.mdpi.com/0718-1876/16/5/80/pdf>
17. Little, C. "5 steps toward a customer-centric experience in financial services." 2019.
<https://www.upthereeverywhere.com/blog/5-steps-of-a-customer-centric-experience-in-financial-services>
 18. Petrova, A. "The top 7 most successful fintech marketing tactics." The Fintech Marketing Hub, 2021.
<https://www.fintechmarketinghub.com/post/fintech-marketing-tactics>
 19. Chesley, L. "Seven Steps to Successful Marketing Technology Adoption," MarketingProfs Article 2015.
<https://www.marketingprofs.com/articles/2015/28596/seven-steps-to-successful-marketing-technology-adoption>
 20. HKMA, HKAB, and HKIB "Capacity Building for Future Banking 2021–2025" Joint Paper by HKMA, HKAB and HKIB. June 2020.
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2020/20200618e1a1.pdf>
 21. Financial Stability Board. "Financial Stability Implications from FinTech: Supervisory and Regulatory Issues that Merit Authorities' Attention." FSB, 2017.
<https://www.fsb.org/wp-content/uploads/R270617.pdf>

Supplementary Readings

1. Dapp, T.F. "Fintech reloaded – Traditional banks as digital ecosystems," Current Issues Digital economy and structural change, 2015.
http://www.spainfinancialcentre.com/sites/default/files/digital_economy_and_structural_change_deutsche_bank.pdf

Further Readings

Nil

6.10 Module 10: Fintech Product Management

A. **Module Objective**

The module aims to make learners understand the building of customer-centric banking products and services by leveraging on FinTech and behavioural economics, and its product management, assurance, and governance methodologies.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Lead the banking product team to address business problems through advanced project governance and assurance techniques, best practices for agile and innovative project methodologies, and state-of-the-art product development and solution delivery models.
- Apprehend and become adept in the behavioural economics behind customer-centric Fintech products and services in banks.

C. **Syllabus**

Chapter 1: Introduction to Customer-Centric Banking Model, Behavioural Economics, and Fintech	
1	- What is “Customer-Centric Banking” and its importance for today <ul style="list-style-type: none"> • Product-Centric vs Customer-Centric, and the differences between traditional banking model and customer-centric banking model • What changes have been making the customer-centric model necessary for today?
2	- What is “Behavioural Economics”? <ul style="list-style-type: none"> • Traditional rational-choice model in economics • People's decisions are also based on psychological bias and limitations on logical reasoning
3	- What is “Fintech”?
Chapter 2: How to use Fintech and Behavioral Economics to achieve Customer-Centric Banking	
1	- Historical review of the use of technology and data in the banking industry <ul style="list-style-type: none"> • A historical review • Technological innovation and improvements
2	- Using data and technology to increase customer satisfaction
3	- Incorporating relevant ideas of behavioural economics and Fintech in

	<p>product development of the banking industry</p> <ul style="list-style-type: none"> • Customer process framework • Rise of digital banking and its evolution • Transforming to customer-centric banking model by leveraging behavioural economics and Fintech • Anticipating the future
Chapter 3: Barriers for moving to Customer-Centric Banking and other issues; Characteristics of banking products project management in banking industry	
1	<ul style="list-style-type: none"> - The barriers to customer-centric banking. What is needed for a successful transformation from traditional banking to customer-centric banking model? <ul style="list-style-type: none"> • The barriers to customer-centric banking • Transformation to customer-centric banking model
2	<ul style="list-style-type: none"> - Project management in general <ul style="list-style-type: none"> • Key stages and components of project management • The role of a project manager • Common issues that cause problems for a project
3	<ul style="list-style-type: none"> - Project management for the Fintech products <ul style="list-style-type: none"> • Characteristics of banking products and services: Traditional and Fintech products • Project management for traditional banking products • Design Thinking in FinTech • Specials for the project management of Fintech products
Chapter 4: Choosing a suitable project management methodology for your banking project	
1	<ul style="list-style-type: none"> - Sequential vs. Agile: Choosing a proper project management methodology for your projects <ul style="list-style-type: none"> • Historical review of the rise of sequential and agile methodologies • Sequential vs. Agile: What are they and their Pros and Cons
2	<ul style="list-style-type: none"> - Choosing a proper project management methodology <ul style="list-style-type: none"> • Matching product characteristics with project management methods • How the choice of project management method can affect product management
3	<ul style="list-style-type: none"> - Choosing of project management method to facilitate and enhance the management of Fintech products
4	<ul style="list-style-type: none"> - Agile project management in the banking industry <ul style="list-style-type: none"> • Why agile project management is getting more attention • "Change" management in agile project management

5	• Common challenges when moving to agile project management
6	- Best practices for agile project management in the banking industry
6	- Use of technology to improve project management
Chapter 5: What is project governance and assurance, its components, and basic principles	
1	- What is project governance?
2	- The importance of project governance
3	- Components of project governance
4	- Key project governance principles for the banking industry with emphasis on Fintech projects
Chapter 6: Governance for agile projects and its best practices	
1	- How to incorporate governance in agile project and its challenges
2	- Best practices of agile governance in the banking industry
3	- What is the difference between the agile and traditional "way of working"?
4	- Best practices for agile way of working
Chapter 7: Transforming to agile way of working and its best practices	
1	- How to transform to agile way of working
2	- Cases and examples of agile way of working
3	- Summary and Conclusion for the module

D. Recommended Readings

Essential Readings

1. "Customer experience as a value driver in German retail banking". Global Banking, McKinsey & Company, January 2019.
<https://www.mckinsey.com/industries/financial-services/our-insights/customer-experience-as-a-value-driver-in-german-retail-banking#:~:text=According%20to%20McKinsey's%202018%20Retail,who%20are%20merely%20%E2%80%9Csatisfied%E2%80%9D%201>
2. "Six Ways to Build a Customer-Centric Culture", by Denise Lee Yohn. Harvard Business Review, October 02 2018.
<https://store.hbr.org/product/6-ways-to-build-a-customer-centric-culture/h04kfv?sku=H04KfV-PDF-ENG>
3. "Maps of bounded rationality: Psychology for behavioral economics", by Daniel Kahneman. American Economic Reviews, 93(5) 2003, p.1449-1475.
<https://pubs.aeaweb.org/doi/pdfplus/10.1257/000282803322655392>
4. "Global FinTech Adoption Index 2019". EY, 2019.
https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/financial-services/ey-

- [global-fintech-adoption-index-2019.pdf?download](#)
5. "Second Round of FinTech-Trends and Challenges", by Anupam Mehrotra, Satish Menon. 2021 2nd International Conference on Computation, Automation and Knowledge Management. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&ar-number=9357759>
 6. "Financial Services Technology 2020 and Beyond: Embracing disruption". PricewaterhouseCoopers, 2020.
<https://www.pwc.com/gx/en/financial-services/assets/pdf/technology2020-and-beyond.pdf>
 7. "Differences between traditional bank model and Fintech based digital bank and Neo-banks models", by Temelkov, Zoran. SocioBrains (74) 2020, p.8-15.
http://eprints.ugd.edu.mk/27605/1/2. Zoran_Temelkov.pdf
 8. "FinTech: Adoption and Innovation in the Hong Kong Banking Industry". Hong Kong Academy of Finance, May 2020.
<https://www.aof.org.hk/docs/default-source/hkimr/applied-research-report/fintechrep.pdf>
 9. "How Financial Services Can Enhance The Digital Customer Experience In The Pandemic Age", by Sanjoy Malik. Forbes, Oct 14 2020.
<https://www.forbes.com/sites/forbestechcouncil/2020/10/14/how-financial-services-can-enhance-the-digital-customer-experience-in-the-pandemic-age/?sh=7ac33cd18764>
 10. "How digitisation is paying for DBS". The Economist, Mar 10, 2018.
<https://www.economist.com/finance-and-economics/2018/03/08/how-digitisation-is-paying-for-dbs>
 11. "Behavior economics-Applied to financial sector". EY Parthenon, April 2021.
https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/strategy/pdf/ey-behavioral-economics-applied-to-financial-sector.pdf?download
 12. "The Last-Mile Problem-How data science and behavioral science can work together", by James Guszczka. Deloitte Review, Issue 16, 2015.
https://www2.deloitte.com/content/dam/insights/us/articles/behavioral-economics-predictive-analytics/DR16_last_mile_problem.pdf
 13. "Executing the open banking strategy in the United States – Engaging with consumers in the journey". Deloitte Insights, 2019.
https://www2.deloitte.com/content/dam/insights/us/articles/5076_open-banking/DI_Open-banking.pdf
 14. "Meeting the Challenge of Disruptive Change", by Clayton M. Christensen and Michael Overdort. Harvard Business Review, March-April 2000.
<https://store.hbr.org/product/meeting-the-challenge-of-disruptive-change/r00202?sku=R00202-PDF-ENG>

15. "Barriers to innovation within large financial services firms", by Patrick Das, Robert Verbury, Alexander Verbraec, Lodewijk Bonebakker. European Journal of Innovation Management, Vol21, No.1, 2018, 96-112.
<https://www.emerald.com/insight/content/doi/10.1108/EJIM-03-2017-0028/full/pdf>
16. "Product managers for the digital world", by Chandra Gnanasambandam, Martin Har-rysson, Shivam Srivastava, and Yun Wu. McKinsey & Company, May 2017.
<https://www.mckinsey.com/~media/McKinsey/Industries/Technology%20Me-dia%20and%20Telecommunications/High%20Tech/Our%20Insights/Prod-uct%20managers%20for%20the%20digital%20world/Product-managers-for-the-digi-tal-world.pdf>
17. "MVP Development - 15 Steps to Build an Effective MVP".
<https://cshark.com/blog/mvp-development-15-steps-to-build-an-effective-mvp/>
18. "11 Standout Examples of Minimum Viable Products".
<https://myva360.com/blog/examples-of-minimum-viable-products>
19. "How to Build an MVP Within a Banking Sector".
<https://s-pro.io/blog/how-to-build-mvp-in-banking-industry>
20. "The 5 Trademarks of Agile Organizations", written collaboratively by the McKinsey Agile Tribe. McKinsey & Company December 2017.
<https://www.mckinsey.com/business-functions/people-and-organizational-perfor-mance/our-insights/the-five-trademarks-of-agile-organizations>
21. "Mixed agile/traditional project management methodology-reality or illusion?", by Mario Spundak. Porcedia-Social and Behavioral Sciences 119 (2014) 993-948.
<https://www.sciencedirect.com/science/article/pii/S187704281402196X>
22. "Product Management Methodologies: Agile vs Waterfall vs Scrum vs Kanban", by Ritika Pradhan.
<https://www.udacity.com/blog/2020/03/product-management-methodologies.html>
23. "Product methodologies: What they are and how to avoid pitfalls", by Goodman, E & Henry, P. (2010). Paper presented at PMI Global Congress 2010.
<https://www.pmi.org/learning/library/product-methodologies-software-development-programs-6529>
24. "The management of project management: A conceptual framework for project gov-ernance", by Eric G. Too and Patrick Weaver. International Journal of Project Man-agement 32 (2014) 1382-1394.
<https://www.sciencedirect.com/science/article/pii/S026378631300094X>
25. "Project governance: #1 critical success factor", by Alie, Salina Sandra. Paper pre-sented at PMI Global Congress 2015.
<https://www.pmi.org/learning/library/project-governance-critical-success-9945>
26. "Agile Governance for Creative Economy 4.0", Briefing Paper, World Economic Fo-rum, October 2019.

- https://www3.weforum.org/docs/WEF_Agile%20Governance_for_Creative_Economy_4.0_Report.pdf
27. "Governance Arrangements for Agile Projects", by Kwete Mwana Nyandongo and Khanya Khanyile. Proceeding of the International Conference on Industrial Engineering and Operations Management Pilsen, Czech Republic, July 23-26, 2019.
<http://ieomsociety.org/pilsen2019/papers/450.pdf>
 28. "Agile and adaptive governance in crisis response: Lessons from the COVID-19 pandemic", by Marjin Janssen, Haiko van der Voort. International Journal of Information Management 55 (2020) 102180.
<https://www.sciencedirect.com/science/article/pii/S0268401220309944>
 29. "Transformation at ING (A): Agile", by WR Kerr, F Gabieli, E Moloney. Harvard Business Review, 2018.
<https://store.hbr.org/product/transformation-at-ing-a-agile/818077?sku=818077-PDF-ENG>
 30. "How to create an agile organization", McKinsey & Company.
<https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/how-to-create-an-agile-organization>
 31. "Leading agile transformation: The new capabilities leaders need to build 21st-century organizations". McKinsey & Company, October 2018.
<https://www.mckinsey.com/~media/mckinsey/business%20functions/people%20and%20organizational%20performance/our%20insights/leading%20agile%20transformation%20the%20new%20capabilities%20leaders%20need%20to%20build/leading-agile-transformation-the-new-capabilities-leaders-need-to-build-21st-century-organizations.pdf>
 32. "Agile methods rapidly replacing traditional methods at Nokia: A survey of opinions on agile transformation", by Maarit Laanti, Outi Salo, Pekka Abrahamsson. Information and Software Technology 53 (2011) 276-290.
<https://www.sciencedirect.com/science/article/pii/S0950584910002119>
 33. "Scaling Agile @ Spotify with Tribes, Squads, Chapters and Guilds", by Henrik Kniberg & Anders Ivarsson, Oct 2012.
<https://blog.crisp.se/wp-content/uploads/2012/11/SpotifyScaling.pdf>
 34. "Agile Transformation at LEGO Group", by Anita Friis Sommer. Research-Technology Management 2019 20-29.
<https://www.dockconsulting.nl/wp-content/uploads/2021/03/Agile-at-Lego.pdf>
 35. "Agile Adoption Best Practices in Canadian Banking", by Hernani Manuel Duarte. Submitted for the Degree of Doctor of Business Administration, Heriot-Watt University, Edinburgh Business School, October 2, 2019.
https://www.ros.hw.ac.uk/bitstream/handle/10399/4274/DuarteHM_0219_ebs.pdf?sequence=1&isAllowed=y

Supplementary Readings

1. “The Business Case for Customer Centricity”, by Lisa Stahl, Barbara Magnoni, Gerhard Coetzee. CGAP, April 2017.
https://www.cgap.org/sites/default/files/Brief-Business-Case-for-Customer-Centricity-Apr-2017_0.pdf
2. “Banking operations for a customer-centric world”. Mckinsey & Company.
<https://www.mckinsey.com/industries/financial-services/our-insights/banking-matters/banking-operations-for-a-customer-centric-world>
3. “The Next Phase of the Banking Open API Journey”. Hong Kong Monetary Authority and Accenture.
https://www.hkma.gov.hk/media/eng/doc/key-functions/ifc/fintech/The_Next_Phase_of_the_Banking_Open_API_Journey.pdf
4. “Reshaping Banking with Artificial Intelligence”. Hong Kong Monetary Authority and PricewaterhouseCoopers.
https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/White-paper_on_AI.pdf
5. “The Next Generation of Data-Sharing in Financial Services: Using Privacy Enhancing Techniques to Unlock New Value”. World Economic Forum, Prepared in collaboration with Deloitte, September 2019.
https://www3.weforum.org/docs/WEF_Next_Gen_Data_Sharing_Financial_Services.pdf
6. “Optimizing data controls in banking”, by Tony Ho, Jorge Machado, Satya Parekh, Kayvaun Rowshankish, and John Walsh. McKinsey & Company 2020.
<https://www.mckinsey.com/business-functions/risk-and-resilience/our-insights/optimizing-data-controls-in-banking>
7. “Fintech reloaded - Traditional banks as digital ecosystems”, by Thomas F. Dapp. Deutsche Bank Research, April 28, 2015.
https://www.dbresearch.com/PROD/RPS_EN-PROD/Fintech_reloaded_%E2%80%93%20Traditional_banks_as_digital_ec/RPS_EN_DOC_VIEW.calias?rwnode=PROD000000000435629&ProdCollection=PROD000000000451937#:~:text=with%20new%20session-,Fintech%20reloaded%20%E2%80%93%20Traditional%20banks%20as%20digital%20ecosystems%3A%20With%20proven%20walled,garden%20strategies%20into%20the%20future&text=Thomas%2DFrank%20Dapp-.The%20time%20is%20ripe%20for%20established%20banks%20to,into%20digital%20platform%2Dbased%20ecosystems.
8. “Tech Giants in Banking: The Implication of a New Market Power”, by Nicola Bilotta and Simone Romano. Istituto Affari Internazionali (IAI) (2019).

- <https://www.iai.it/en/pubblicazioni/tech-giants-banking-implications-new-market-power>
9. “Disruptive technology: How Kodak missed the digital photography revolution”, by Henry C. Lucas Jr., Jie Mein Goh. *Journal of Strategic Information Systems* 18 (2009) 46-55.
<https://reader.elsevier.com/reader/sd/pii/S0963868709000043?to-ken=CC2F706A8561B872B540070BEA40D143579541CA19059F39E6E2806C28FF36E02375F69ADEB92F993D22ADE762703BB4&originRegion=us-east-1&originCreation=20220311063625>
 10. “Next-gen Technology transformation in Financial Services”, by Vik Sohoni, Xavier Lhuer, Somest Khanna”. McKinsey & Company, April 2020.
https://www.mckinsey.com/~/_/media/mckinsey/industries/financial%20services/our%20insights/next-gen%20technology%20transformation%20in%20financial%20services/next-gen-technology-transformation-in-financial-services.pdf
 11. “Assessment of Minimum Viable Product Techniques: A Literature Review”, by Mohammadsaleh Saadatmand. Engineering and Technology Management Student Projects, Portland State University, Fall 2017.
https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=2178&context=etm_studentprojects
 12. “A Step-by-Step Guide to Build a Minimum Viable Product (MVP)”.
<https://www.netsolutions.com/insights/how-to-build-an-mvp-minimum-viable-product-a-step-by-step-guide/>
 13. “What's the Difference? Agile vs Scrum vs Waterfall vs Kanban”, by Smartsheet Contributor Kate Eby on Feb 15, 2017.
<https://www.smartsheet.com/agile-vs-scrum-vs-waterfall-vs-kanban>
 14. “Risks Characteristic of Agile Project management methodologies and responses to them”, by Wojciech Walczak and Dorota Kuchta. *Operations Research and Decision* No.2, 2013, 75-95.
https://www.academia.edu/35003479/RISKS_CHARACTERISTIC_OF_AGILE_PROJECT_MANAGEMENT_METHODOLOGIES_AND_RESPONSES_TO_THEM
 15. “The relationship between project governance and project success”, by Robert Joslin and Ralf Muller. *International Journal of Project Management* 34 (2016) 613-626.
https://www.researchgate.net/publication/296703744_The_Relationship_between_Project_Governance_and_Project_Success
 16. “Fundamental uncertainties in projects and the scope of project management”, by Roger Atkinson, Lynn Crawford, Stephen Ward. *International Journal of Project Management* 24 (2006) 687-698.
<https://reader.elsevier.com/reader/sd/pii/S0263786306001438?to-ken=F6D864685DD5FA825183A0796CB74EDFD0CA5EF367D4702F39C1DE44D3>

- [A4B3AFB3CB1E4EAB5F5F4408FA65D515655E18&originRegion=us-east-1&originCreation=20220311071442](https://skemman.is/bitstream/1946/16301/1/Sigurj%c3%b3n_P%c3%a1ll_Kolbeins_agile_traditional_project_culture_2013.pdf)
17. "Project culture using Agile project management in hand with traditional project management", by Sigurjon Pall Kolbeins. Paper presented as part of requirements for the degree of Master of Project Management at the School of Science and Engineering, Reykjavik University, May 2013.
[https://skemman.is/bitstream/1946/16301/1/Sigurj%
beins agile traditional project culture 2013.pdf](https://skemman.is/bitstream/1946/16301/1/Sigurj%c3%b3n_P%c3%a1ll_Kolbeins_agile_traditional_project_culture_2013.pdf)
 18. "What Does it Take to Be Agile? - Evidence from the Banking Industry", by Sebastian Weber. Bachelor Thesis, University Oldenburg, 3 Sept 2020.
<http://oops.uni-oldenburg.de/4711/1/What%20Does%20it%20Take%20to%20Be%20Agile%20-%20Evidence%20from%20the%20Banking%20Industry.pdf>
 19. "A Case Study in Agile-at-Scale Delivery", by Alan W. Brown. Conference: Agile Processes in Software Engineering and Extreme Programming - 12th International Conference, XP 2011, Madrid, Spain, May 10-13, 2011. Proceedings p266-282.
<https://link.springer.com/content/pdf/10.1007%2F978-3-642-20677-1.pdf>
 20. "Challenges of Adopting SAFe in the Banking Industry - A Study Two Years After Its Introduction", by Sara Nilsson Tengstrand, Piotr Tomaszewki, Markus Borg, Ronald Jabangwe. Conference Paper, 10 June 2021.
https://link.springer.com/content/pdf/10.1007%2F978-3-030-78098-2_10.pdf
 21. "How to mess up your agile transformation in seven easy (mis)steps", by Christopher Handscomb, Allan Jaenicke, Khushpreet Kaur, Belkis Vasquez-McCall, and Ahmand Zaidi. Organization Practice, McKinsey & Company, April 2018.
<https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/how-to-mess-up-your-agile-transformation-in-seven-easy-mis-steps>

Further Readings

1. "Thinking, Fast and Slow" by Daniel Kahneman (Book, ISBN: 978-0374533557)
2. "FinTech and Banking. Friends or Foes?", European Economy-Banks, Regulation, and the Real Sector.
https://european-economy.eu/wp-content/uploads/2018/01/EE_2.2017-2.pdf
3. "Bank 4.0: Banking Everywhere, Never at a Bank" by Brett King (Book, ISBN: 978-1-119-50650-8)
4. "Behavioral Economics: The Bank's Secret Weapon", published by Strands (eBook, <https://info.strands.com/ebook-behavioral-economics>)"
5. "Financial innovation: the bright and the dark sides", by Thorseten Beck, Tao Chen,

- Chen Lin, Frank M. Song. Journal of Banking and Finance 72 (2016) 28-51.
<https://reader.elsevier.com/reader/sd/pii/S0378426616301133?to-ken=D0676492BD004F64436BC6AD3F287FAB7FEB4EE5C2663C98FE45E2B44171A39FB2DC3A398575669E2E566775D0E78B38&originRegion=us-east-1&originCreation=20220311064006>
6. "How Blockchain Will Change Organizations", by Don Tapscott, Alex Tapscott. MIT Sloan Management Review, Winter 2017.
<https://sloanreview.mit.edu/article/how-blockchain-will-change-organizations/>
 7. "Disassembling the Elephant-Translating Agile Project Management into a Banking Context", by Fanny Rosengren and Linnea Windahl Stromblad. Master Degree Project in Management, School of Business, Economics and Law, University of Gothenburg.
https://gupea.ub.gu.se/bitstream/handle/2077/52981/gupea_2077_52981_1.pdf?sequence=1
 8. "Project Governance 17 Success Secrets - 17 Most Asked Questions on Project Governance - What You Need To Know", by Christine Townsend. Emereo Publishing, October 2014.
(Book, ISBN: 9781488866654)
 9. "Sound Practices: Implications of fintech developments for banks and bank supervisors", by Basel Committee on Banking Supervision, Bank for International Settlements 2018. <https://www.bis.org/bcbs/publ/d415.pdf>
 10. "Fintech and the digital transformation of financial services: implications for market structure and public policy": BIS Papers No 117 (July 2021), Monetary and Economic Department, Bank for International Settlements.
<https://www.bis.org/publ/bppdf/bispap117.pdf>
 11. "Agile Governance and Audit", by Christopher Wright. ITPG, Jun 2014
(eBook, ISBN: 9781849285889)
 12. "Historical Roots of Agile Methods: Where Did "Agile Thinking" Come From?", by Noura Abbas, Andrew M. Gravell, and Gary B. Wills. Agile Processes in Software Engineering and Extreme Programming-9th International Conference, XP 2008 94-103.
<https://link.springer.com/content/pdf/10.1007%2F978-3-540-68255-4.pdf>

6.11 Module 11: Regtech

A. **Module Objective**

The module aims to make learners understand the global RegTech trends and applications in virtual identity and digital authentication management, data and cyber security, financial crime investigation, IT audit and regulatory compliance.

B. **Module Intended Learning Outcomes**

Upon completion of this module, learners should be able to:

- Develop robust knowledge of Regtech best practices, Regtech solutions and their effective applications
- Apply business knowledge to identify, manage, and maintain the best practices on risk management and regulatory compliance.
- Develop a deep understanding of the development processes of Regtech solutions (i.e. development, validation, implementation and governance).
- Demonstrate proficiency in Regtech related technology concepts and principles to be able to select the appropriate technology solution provider and apply technology knowledge for business integration, risk management and regulatory compliance.

C. **Syllabus**

Chapter 1: Legislative Framework and Regulatory Technology (RegTech) Overview	
1	- RegTech Taxonomy, LoNG PESTEL, BIDT
2	- Why banking is under regulation?
3	- History of RegTech
4	- RegTech 1.0, 2.0,
5	- RegTech – Digital Identity, Digital Signature
6	- Managing Trust and Managing Risk
Chapter 2: Data, Financial Intelligence, and Customer Protection	

1	- RegTech – Cyber Crime, Financial Crime
2	- CTF (counter terrorism financing), AML (anti-money laundering) and KYC (know your client)
3	- KYC Exercise / Assignment – Design and Build a RegTech re. KYC services
4	- Data Governance in Open Banking RegTech – ownership, stewardship, custodian
5	- Digital (Computer) Forensics in RegTech
6	- Corporate Strategy, Data Governance and Incident Response
7	- Exercise / Assignment – Financial Intelligence RegTech 1.0
Chapter 3: Disruptive Changes in Banking, Finance and Regulations	
1	- Challenge in RegTech 1.0 – HSBC Case Study
2	- What is a “bank”? What is the purpose of “banking”?
3	- Disruptive Innovation and Technology in Banking and Finance
4	- Scoping Exercise re. Future Money and Crypto-tokens
5	- Disruptive Changes impacting Banking and Regulation
6	- Background Knowledge – Past, Present and Future of Tokenization and Tokenomics
Chapter 4: RegTech Case Analysis I	
1	- CIBC – Internalizing Open Innovation
2	- Deutsche Bank – Pursuing Blockchain Opportunities
3	- Anti-money Laundering: The Banking Industry in Hong Kong
4	- BSI Bank of Switzerland: Victim of Growth or a Perpetrator of a Crime
Chapter 5: RegTech Case Analysis II	
1	- Fraud at Bank of Baroda: Manage Risk or Manage Crisis
2	- RegTech 1.0 – Common Reporting Standard (CRS) / FATCA (Foreign Account Tax Compliance Act)
3	- Assignment / Exercise – Amarcord Incorporated: Combating Money Laundering Using Data Analytics
4	- Money Laundering at Agnes Insurance – Digital Forensics and Litigations
5	- A Multidisciplinary Digital Forensic Investigation Process Model
6	- RegTech 1.0 Tool Box – AML / CFT
7	- Third Party Vendor Relationships
8	- RegTech 1.0 Tool Box – Regulatory Change Management, Regulatory Risk Management,
Chapter 6: Banking Strategy: Crossroad RegTech 1.0 or RegTech 2.0	

1	- Case Study: RegTech 2.0 as an Integral part of WealthTech Application / Robo-Trader
2	- What is RegTech 2.0
3	- Is the landscape ready for RegTech 2.0
4	- Open Banking APIs, Open Banking Architecture – RegTech 2.0
5	- - HKMA RegTech Use Case Analysis
Chapter 7: Smart Banking, Smart RegTech	
1	- Faster Payment System (FPS) and RegTech 2.0
2	- Case Analysis – Lending Club
3	- CBDC (Central Bank Digital Currency) / DCEP (Digital Currency Electronic Payment)
4	- Smart Contracts
5	- Algorithmic Regulation: Automating Financial Compliance Monitoring and Regulation using AI and Blockchain
6	- Standards-Based Technology Architecture for RegTech
7	- Future Banking and RegTech Strategy

D. Recommended Readings

Essential Readings

1. UNCITRAL Model Law on e-Commerce.
https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_commerce
2. UNCITRAL Model Law on Electronic Signatures.
https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_signatures
3. Electronic Transaction Ordinance and Digital Signature.
<https://www.elegislation.gov.hk/>
4. Convention on Cybercrime.
<https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=185>
5. Anti Money Laundering and Counter Terrorism Financing.
<https://www.unodc.org/unodc/en/money-laundering/overview.html>
6. Evidence Ordinance and Electronic Evidence.
<https://www.elegislation.gov.hk/hk/cap8>
7. Standard of Proof.
http://criminalnotebook.ca/index.php/Standard_of_Proof
8. Data Life Cycle Management.
<https://www.dataworks.ie/5-stages-in-the-data-management-lifecycle-process/>
<https://www.bloomberg.com/professional/blog/7-phases-of-a-data-life-cycle/>
9. Big Data.
<https://www.selecthub.com/big-data-analytics/types-of-big-data-analytics/>

10. Open Source Intelligence for Financial Investigator and AML Practitioners.
<https://blackdotsolutions.com/blog/open-source-investigation-best-practices/>
<https://blackdotsolutions.com/blog/what-is-osint/>
<https://aml-toolbox.medium.com/financial-crimes-osint-tools-banking-5ede7edbc14f>
11. Four different types of intelligence and data analytics
<https://iterationinsights.com/article/where-to-start-with-the-4-types-of-analytics/>
12. Cyber Crimes involving Financial Institutes.
<https://carnegieendowment.org/specialprojects/protectingfinancialstability/timeline>
<https://learningcenter.sourceintelligence.com/financial-crime-supply-chains>
13. Dey, A., Heese, J., & Weber, J., "RegTech at HSBC", Harvard Business Review, October 9, 2019.
<https://store.hbr.org/product/regtech-at-hsbc/120046?sku=120046-PDF-ENG>
14. E. Soltes, G. Ros and G. Liu, "An introduction to Money Laundering: The Hunter", Harvard Business Review 2020.
<https://store.hbr.org/product/an-introduction-to-money-laundering-the-hunter/121011>
15. "FinTech and the Strategy in the 21st Century, Chapter 6 - Understand RegTech for Digital Regulatory Compliance" p.85 - 102, T. Butler and L. O'Brien, Palgrave Macmillan.
https://link.springer.com/content/pdf/10.1007%2F978-3-030-02330-0_6.pdf
16. RegTech Trends and top 100 RegTech companies
<https://www.apiax.com/regtech-guide/>
17. Chandrasekhar, R, "CIBC: Internalizing Open Innovation", Ivey Publishing, Ivey Business School, Western University, 2017.
<https://store.hbr.org/product/cibc-internalizing-open-innovation/W17728>
18. L.M. Applegate, R. Beck and C. Muller-Bloch "Deutsche Bank Pursuing Blockchain Opportunities (A) and (B)", Harvard Business School Publishing, Apr 11, 2017.
<https://store.hbr.org/product/deutsche-bank-pursuing-blockchain-opportunities-a/817100?sku=817100-PDF-ENG>
<https://store.hbr.org/product/deutsche-bank-pursuing-blockchain-opportunities-b/817101?sku=817101-PDF-ENG>
19. C. Wong, Y.F. Lam and R. Chung, "Anti Money Laundering The Banking Industry in Hong Kong", The Asia Case Research Centre, May 11, 2020
<https://hbsp.harvard.edu/product/HK1233-PDF-ENG>
20. Cantale, S., and Buche, I., "BSI Bank of Switzerland: Victim of Growth or Perpetrator of a Crime?", IMD, Lausanne, Switzerland, 12/10/2016.
<https://store.hbr.org/product/bsi-bank-of-switzerland-victim-of-growth-or-perpetrator-of-a-crime/IMD846>
21. Interview vs Interrogation.
<https://pressbooks.bccampus.ca/criminalinvestigation/chapter/chapter-9-interviewing->

- [questioning-and-interrogation/](#)
22. Risk Management.
<https://www.jisc.ac.uk/guides/risk-management/five-step-model>
 23. Dhamija, S., "Fraud at Bank of Baroda: Manage Risk or Manage Crisis", Richard Ivey School of Business, 2016.
<https://store.hbr.org/product/fraud-at-bank-of-baroda-manage-risk-or-manage-crisis/W16476>
 24. "Report: RegTech for CRS/FATCA - A Snapshot", Setting Digital Standard, Dec 2018.
https://www.sds.at/wp-content/uploads/2019/03/SDS_REPORT_Reg-Tech_for_FATCA%EF%80%A2CRS_REPORT_EN.pdf
 25. Khachatryan, D, "Armacord Incorporated: Combatting Money-laundering Using Data Analytics", Babson College, 2014.
<https://hbsp.harvard.edu/product/BAB260-PDF-ENG?activeTab=overview&itemFindingMethod=>
 26. AML/CFT Regtech: Case Studies and Insights, January 2021, Hong Kong Monetary Authority.
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2021/20210121e1a1.pdf>
 27. Gopal, A., and Chandrasekhar, "KPMG Forensic: Money Laundering at Agnes Insurance", Richard Ivey School of Business 2004.
<https://store.hbr.org/product/kpmg-forensic-money-laundering-at-agnes-insurance/904E04>
 28. Lutui, R., "A Multidisciplinary Digital Forensic Investigation Process Model", Kelly School of Business, Indiana University 2016.
<https://store.hbr.org/product/a-multidisciplinary-digital-forensic-investigation-process-model/BH766>
 29. The Wall Street Code, VPRO documentary 2013.
<https://www.youtube.com/watch?v=kFQJNeQDDHA>
 30. How algorithms shape our world - Kevin Slavin
<https://www.youtube.com/watch?v=ENWVRcMGDoU>
 31. FinTech disruptor
<https://www.cbinsights.com/blog/disrupting-european-banking-fintech-startups/>
 32. Egner, T., "Open APIs and Open Banking: Assessing the Impact on the European Payments Industry and Seizing the Opportunities", The CAPCO Institute Journal of Financial Transformation, No. 45, April 2017.
https://www.capco.com/-/media/CapcoMedia/Capco-Institute/Journal-45/JOURNAL45_1_Egner.ashx
 33. HPS, "The Transformation of Banking and Payments Through Open APIs HPS White paper", June 2019.

- https://www.hps-worldwide.com/sites/default/files/blog/The%20Transformation%20of%20Banking%20and%20Payments%20Through%20Open%20APIs_HPS_White%20paper_0.pdf
34. FPS
<http://www.fasterpayments.org.uk/about-us/how-faster-payments-works>
<https://www.hkma.gov.hk/media/eng/publication-and-research/quarterly-bulletin/qb201809/fa2.pdf>
35. RegTech vs SupTech: What You Need to Know.
<https://www.ncontracts.com/nsight-blog/what-you-need-to-know-regtech-vs-suptech>
36. Innovative Technology in Financial Supervision (SupTech) - the experience of early users, Bank for International Settlement.
<https://www.bis.org/fsi/publ/insights9.pdf>
37. CBDC / DCEP
<https://cbdctracker.org/>
<https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp>
<https://boxmining.com/dcep/>
38. Banking-as-a-Service (BaaS)
<https://www.businessinsider.com/westpac-10x-future-technologies-partner-for-banking-as-a-service-2019-11>
<https://medium.com/fintechtris/fintech-focus-what-is-banking-as-a-service-baas-2627e9a73377>
<https://www.capgemini.com/2018/04/the-bank-of-the-future-an-ecosystem-of-services/>
39. HKMA Use Cases in RegTech
<https://www.hkma.gov.hk/eng/key-functions/banking/regtech-knowledge-hub/regtech-developments/>

Supplementary Readings

1. UNCITRAL Model Law on Electronic Commerce with Guide to Enactment 1996 (full paper).
https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/19-04970_ebook.pdf
2. UNCITRAL Model Law on Digital Signature (full paper).
<https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/ml-el-ecsig-e.pdf>
3. Model Legislation on Money Laundering and Financing of Terrorism
<https://www.imolin.org/pdf/imolin/ModelLaw-February2007.pdf>
4. Model Law on Electronic Evidence.

- https://thecommonwealth.org/sites/default/files/key_reform_pdfs/P15370_7_ROL_Model_Bill_Electronic_Evidence_0.pdf
5. HK Ordinance CAP 8, 161, 200, 405, 455, 486, 528, 575. 593.
<https://www.elegislation.gov.hk>
 6. ISO 27001 definition: What is ISO 27001?
<https://www.itgovernance.co.uk/iso27001>
 7. CMMC self assessment tool.
<https://www.celerium.com/request-cmmc-assessment-tool?hsCtaTracking=095a8e06-76ae-44fa-899a-04c77974b791%7C2d0eb223-ca98-4228-9190-f33d44d5d54e>
 8. NIST framework.
<https://www.nist.gov/cyberframework>
 9. Vizion software.
<https://www.vizionsoftware.com/regulatory-reporting-software-for-financial-institutions>
 10. Regnology.
<https://www.regnology.net/en/>
 11. The investigator-centered approach to financial crime: Doing what matters
<https://www.mckinsey.com/business-functions/risk-and-resilience/our-insights/the-investigator-centered-approach-to-financial-crime-doing-what-matters>
 12. The 5 largest money laundering scandals of all time... so far.
<https://medium.com/kyc-io-scalable-kyc-management-solutions/the-5-largest-money-laundering-scandals-of-all-time-so-far-d30ff4abee10>
 13. AML cases.
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2021/20210121e1a1.pdf>
 14. WealthTech and RegTech.
<https://www.thewealthmosaic.com/vendors/apiax/twm-articles/wealthtech-views-report-the-view-from-apiax/>
 15. Javers, E, "Thomson Reuters Gives Elite Traders Early Advantage", 12 June, 2013.
<https://www.cnbc.com/2013/06/12/thomson-reuters-gives-elite-traders-early-advantage.html>
 16. China's National Digital Currency DCEP / CBDC Overview.
<https://boxmining.com/dcep/>
 17. Accenture, "Faster Payments New Access Model. Creating a Competitive Market in Access Services for Real Time, 24/7 Payments", 2015.
<http://www.fasterpayments.org.uk/sites/default/files/Faster%20Payments%20Access%20Programme%20Economics%20Report%20-%20Online%20Version.pdf>
 18. HKMA CFI 2.0
<https://www.hkma.gov.hk/eng/news-and-media/press-releases/2020/11/20201103-4/>
 19. NIST

<https://csrc.nist.gov/Projects/risk-management#:~:text=The%20NIST%20Risk%20Management%20Framework,to%20support%20implementation%20of%20risk>

Further Readings

1. Understanding digital signatures.
<https://www.docuSign.ca/how-it-works/electronic-signature/digital-signature/digital-signature-faq>
2. European Commission, "Introduction to the Connecting Europe Facility eID Building Block.", March 2016.
http://www.esens.eu/sites/default/files/building_block_dsi_introdocument_eid-v1.04_4.pdf
3. Cloud-based IT security policy template generator allows you generate your security policy template, within minutes, guaranteed.
https://www.instantsecuritypolicy.com/it-security-policies.html?keyword=it%20security%20policies&matchtype=e&network=g&adposition=&device=c&gclid=Cj0KCQjw_fiLBh-DOARIsAF4khR21_6FWPXR3HwPkHukyA02EjyG1Jok2VyoYSc-PjwH5yzU-LeU1vKYEaAkPfEALw_wcB
4. C. Hadnagy, "Social Engineering, Second Edition: The Science of Human Hacking", 2018 John Wiley & Sons, Inc.
(Book, ISBN: 978-1-119-43338-5)
5. K. Mitnick, "The Art of Deception: Controlling the Human Element of Security", 2003 Kevin D. Mitnick (P)2009 Tantor Audio.
(Book, ISBN: 978-0764542800)
6. D. Khachatryan, "Armacord Incorporated" Combatting Money Laundering Using Data Analytics", Harvard Business Review 2012.
<https://hbsp.harvard.edu/product/BAB260-PDF-ENG>
7. Cantale, S. and Buche, I., "BSI Bank of Switzerland Victim of Growth or Perpetrator of a Crime ?", IMD 2016.
<https://store.hbr.org/product/bsi-bank-of-switzerland-victim-of-growth-or-perpetrator-of-a-crime/IMD846>
8. Cohen, L, Malloy, C., & Foreman, M, "Domeyard: Starting a High Frequency Trading (HFT) Hedge Fund", Harvard Business Review, 2015.
<https://www.hbs.edu/faculty/Pages/item.aspx?num=48844>
9. Evan, B, "Disrupting Wall Street: High Frequency Trading", Ivey Publishing, Ivy Business School, Western University, 2014.
<https://store.hbr.org/product/disrupting-wall-street-high-frequency-trading/W14540>
10. Casey, E., "Handbook of Digital Forensics and Investigation", Academic Press Nov

2009. https://books.google.com.hk/books?id=xNjsDprqtUYC&printsec=copyright&redir_esc=y#v=onepage&q&f=false

11. Hayek, F.A., "Denationalization of Money: The Argument Refined. An Analysis of the Theory and Practice of Concurrent Curriencies", Third Edition, The Institute of Economic Affairs, 1990.

<https://nakamotoinstitute.org/static/docs/denationalisation.pdf>

7. Training Application

7.1 Training Schedule

For the latest information about the training application period and class schedules, please refer to [Training Schedule \(Core Level\)](#) or [Training Schedule \(Professional Level\)](#) on HKIB website.

7.2 Training Mode and Duration

The training durations of Core Level and Professional Level are set out as follows:






Training Mode	Core Level	Lecture
	Professional Level	Lecture and Video-Assisted Training (VAT)
Training Duration	Module 1	9 hours
	Module 2 – 3	15 hours per module
	Module 4 – 11	21 hours per module

Designated cohorts / sessions of Professional Level are conducted using Video-Assisted Training with pre-recorded videos and facilitation support of designated teaching assistant. For details, please refer to the Training Schedule on HKIB website.

7.3 Training Application

Applicants can submit the application via the electronic application form in HKIB webpage. Attention should be paid to the application deadline or a late entry fee will be charged.










Application Requirements:

-  The information provided for the training enrolment must be true and clear.
-  Inaccurate or incomplete applications may not be accepted even if the applicant has paid the training fee.
-  HKIB reserves the right to reject late applications and / or any applications deemed inappropriate. Once HKIB has received an application form, NO alterations to the training arrangement are allowed.
-  HKIB reserves the right to change training dates and application deadlines at any time.
-  Applicants are advised to retain a copy of the completed application form for their own records.

7.4 Training Fee and Payment

Module	2024 Training Fee (HKD) per module *
1	5,600
2 - 3	7,000
4	8,300
5 - 11	11,500

* Digital version of training material (e.g. PPT Slides) will be provided before the training commencement. Printed version will only be available at an additional cost of HKD600 per module (including delivery fee) on request by learners.

-  Applicants should pay the training fee as follows:
 - (a) By credit card. Please provide your credit card information on the application form.
 - (b) By FPS payment. Please provide your FPS payment receipt.
-  Application forms without payment instructions are **NOT** processed.
-  All payments must be settled before the start of the Programme. **NO** fees are refunded or transferred under any circumstances.
-  Applicants are advised to keep a record of their payment.
-  Confirmation of training application is sent to applicants via email at least **5 working days prior to the training date**.
-  Late training enrolment will be accepted after the stipulated application deadline up to 7 days before course commencement to allow us to administer the application. A late entry fee of HKD200 (in addition to the training fee) will apply.
-  HKIB reserves the right to adjust training application, study guide and / or administration surcharge fees (if applicable), at any time.
-  The programme is subject to The Pilot Scheme on Training Subsidy for Fintech Practitioners offered by the Government of HKSAR (Pilot Scheme). Eligible practitioners have to apply via their AI employer for reimbursement of 80% of the training costs (i.e. the tuition fee and first-time examination fee) for each eligible professional qualification, subject to a cap of HK\$25,000. For more details, please visit [The Pilot Scheme on Training Subsidy for Fintech Practitioners](#).
-  HKIB student members can enjoy 25% off training fee discount. However, those student members will no longer be eligible for the Pilot Scheme in the future.

8. Examination Application and Regulations

8.1 Examination Mode and Format

The examination mode and format for Core Level[#] are as follows:

Module	1 / 2	3 / 4
Examination Mode	Paper-based Examination	
Examination Duration	2 hours per Module	3 hours per Module
Question Type	Multiple-choice Type Questions (MCQs)	Multiple-choice Type Questions (MCQs) & Essay Type Questions
No. of Questions	60 MCQs per Module	50 MCQs & 2 out of 3 short questions per Module
Pass Mark	60%	
Grading	Grade	Mark Range
	Pass with Distinction	>85%
	Pass with Credit	75% - 85%
	Pass	60% - 74%
	Fail A	56% - 59%
	Fail B	46% - 55%
	Fail C	<46%
Absent	N/A	

The examination mode and format for Professional Level* are as follows:

Module	5	6 / 7 / 10	8 / 9 / 11
Examination Mode	Paper-based Examination		
Examination Duration	3 hours per Module		
Question Type	Essay Type Questions	Multiple-choice (MCQs) & Essay Type Questions	Essay Type Questions
No. of Questions	Section A – 2 out of 3 questions & Section B – 2 questions	Section A – 50 MCQs & Section B – 2 out of 3 questions	4 out of 5 questions per Module
Pass Mark	50%		
Grading	Grade		Mark Range
	Pass with Distinction		>80%
	Pass with Credit		65% - 80%
	Pass		50% – 64%
	Fail A		46% - 49%
	Fail B		36% - 45%
	Fail C		<36%
Absent		N/A	

All examinations for Core Level are closed-book examinations.


* All examinations for Professional Level are open-book examinations, except Section A in Module 6, Module 7 and Module 10.


8.2 Examination Timetable

For latest information about the examination application period and examination dates, please [Examination Schedule \(Core Level\)](#), or [Examination Schedule \(Professional Level\)](#) on [HKIB website](#).

8.3 Examination Approaches

There are two examination approaches available and candidates may choose either one which is best for them.

 Face-to-face Examination: Traditional face-to-face examinations will be conducted at designated venues arranged by HKIB. Candidates are required to take examinations at specific locations allocated to them accordingly.









 “Remote Exam”: As an alternative to the traditional face-to-face examination, HKIB had introduced an innovative initiative, “Remote Exam”, allowing candidates to take examinations from their homes or workplaces with own computer equipment and internet access. “Remote Exam” offers greater flexibility in terms of location and time saving on travelling for our candidates without jeopardising the quality standard of assessment. Measures will be taken to align the same standard of fairness and effectiveness as that of the traditional face-to-face examination. A two device-approach will be adopted with one computer, either desktop or laptop, to access the “Remote Exam” platform for the examination and a mobile device, either smartphone or tablet, for invigilation and monitoring. Authentication of identity and real-time virtual invigilation will be conducted hassle-free with an automatic remote system to ensure the highest degree of integrity and data security.

To ensure smooth examination operations, candidates opting “Remote Exam” are required to participate in the “Rehearsal Practice Examination” to be held by HKIB before eligible to attend the formal examination. This arrangement will facilitate the candidates to get better preparation and understanding on the logistic arrangement of the “Remote Exam”.

8.4 Examination Application

 Candidates taking current training classes can choose to sit for the current examination




or any subsequent ones. They can choose to sit for subsequent examinations but if the corresponding programme has been changed or updated, they may be required to re-take the training in order to be eligible for module examination.

-  Applicants can submit the application via the electronic application form in HKIB webpage. Attention should be paid to the application deadline, or a late entry fee will be charged.
-  The information provided on the application form must be true and clear.
-  Late examination enrolment will be accepted after the stipulated application deadline up to 14 days before examination date, to allow us to administer the application. A late entry fee of HKD200 (in addition to the examination fee) will apply.
-  Inaccurate or incomplete applications may not be accepted even if the applicant has paid the examination fee.
-  Under no circumstances are changes to module entry allowed.
-  HKIB reserves the right to reject late applications and / or any applications deemed inappropriate. Once HKIB has received the application form, NO alterations to the examinations and examination arrangements are allowed.
-  HKIB reserves the right to change examination dates and application deadlines at any time.
-  Applicants are advised to retain a copy of the completed application form for their own records.

8.5 Examination Fee and Payment

Module	2024 Examination Fee per module (HKD) ^
1 – 4	1,400
5 -11	2,300

^ HKIB student members can enjoy 50% off examination fee discount. However, those student members will no longer be eligible for the Pilot Scheme in the future.

-  Applicants should pay the examination fee:
 - (a) By credit card. Please provide your credit card information on the application form.
 - (b) By FPS payment. Please provide your FPS payment receipt.
-  Application forms without payment instruction are **NOT** processed.
-  All payments must be settled before the examination. **NO** fees are refunded or

transferred under any circumstances.

- ✚ Applicants are advised to keep a record of their payments.
- ✚ HKIB reserves the right to adjust the examination, study guide and / or administration surcharge fees (if applicable), at any time.

8.6 Examination Attendance Notice

- ✚ Examination Attendance Notices (Attendance Notices) are sent to candidates via **email ONLY** approximately **two weeks** before the examination. Candidates must inform the Institute if they have not received it **one week** before the examination.
- ✚ Candidates are required to print a copy of the Attendance Notice on a sheet of plain A4 paper before attending each examination.
- ✚ Candidates **MUST** present their Attendance Notice at the examination along with a valid identification document (e.g. an HK Identity Card or passport) bearing a current photograph. Photocopies are not accepted.
- ✚ For candidates attending “Remote Exam”, details regarding the prerequisite “Rehearsal Practice Examination” will also be attached.

8.7 Alteration / Transfer of Application for an Examination

- ✚ HKIB reserves the right to cancel, postpone and / or reschedule the examination.
- ✚ If an examination is rescheduled, HKIB notifies candidates of the new date and time via email within 1 week of the original schedule. Under such circumstances, candidates are not required to re-register for the examination.
- ✚ Under no circumstances are any changes to or transfers of examination application allowed.

8.8 Examination Arrangements for Candidates with Special Needs

- ✚ Candidates with special needs may request special examination arrangements. Under these circumstances they are required to submit documentary evidence, such as medical proof issued by a registered medical practitioner, together with a written request, when applying for the examination. Approval of the request is subject to final HKIB decision.
- ✚ Request for such arrangements may result in an additional charge.

8.9 Examination Preparation











- ✚ Candidates enrolled in the examination are required to study all the essential, recommended and further reading material, if applicable, as part of their examination preparation.

8.10 Examination Results






- ✚ Candidates may check their examination results online through HKIB online platform. Candidates will receive email notification once the examination results are available. For Module 1 to Module 2 examination, result will be released within four weeks after the examination date. For Module 3 to Module 11 examination, result will be released around eight weeks after the examination date of the last module of the exam diet. The online examination results will be removed one month after they are released.
- ✚ Candidates will receive their results slip by e-mail within two weeks after the examination result is released through HKIB online platform.
- ✚ Results are withheld from candidates who have not paid in full any monies due or payable to the Institute, including but not limited to examination application fees.
- ✚ Candidates may request rechecking or remarking of their examination scripts within one month of the issue of examination results by submitting a written request via [HKIB website](#). Please note that there is a rechecking fee of HKD500 per module and remarking fee of HKD1,700 per module. Rechecking is only applied to the type of MCQ examination while remarking is applied to other types of examination.

8.11 General Examination Regulations

- ✚ An examination is governed by the regulations in force at the time of the examination and not at the time of application, in case there are discrepancies between the two sets of regulations.
- ✚ On all matters concerning interpretation of the regulations, the Professional Standard and Examination Board of the Institute has the final decision.
- ✚ Candidates must complete the training class before taking the examination.
- ✚ The examination is conducted in English.
- ✚ Candidates must use an HB/2B pencil to answer the multiple-choice questions on the Answer Sheets.

-  Examinations are conducted and invigilated by responsible persons appointed by HKIB.
-  Examination Attendance Notices are sent to candidates via email **ONLY**. Candidates are required to print a copy on a plain sheet of A4 paper and **MUST** present their Attendance Notice to each examination, along with a valid identification document (e.g. HK Identity Card or passport). Attendance Notices are collected by the invigilators before the end of the examination, if necessary.
-  Candidates should arrive at the examination venue at least 15 minutes before the start. Candidates must not enter the examination room until instructed to do so.
-  Candidates are not allowed to sit for the examination if they are unable to present Attendance Notice/valid identification document, or if the identification document does not contain a clear and current photograph of the candidate.
-  All examinations begin at the time stated on the Attendance Notice. Latecomers may be admitted during the first 30 minutes of the examination, but extra time will not be given to compensate for any time lost.
-  Smoking, eating, and drinking are not allowed in the examination room. All mobile phones and other electronic devices must be switched off and placed in a location advised by the invigilator before the examination begins.
-  All bags, books and other personal belongings must be placed in a location advised by the invigilator, before the examination begins.
-  If you need to go to the toilet during the examination, you should seek permission from an invigilator. An invigilator will accompany you and you must NOT carry any mobile phones, other electronic devices, question books, answer sheets or other papers to the toilet.
-  No other aids, such as books, dictionaries, computers (e.g. notebooks, PC tablets) or papers are permitted in the close-book examination. No draft paper is provided during the examination. Rough workings or notes should be made on the question book and will not be marked.
-  The packets of question papers are opened in the presence of the candidates before the start of the examination. Candidates should remain silent and are not allowed to communicate with other candidate during the examination. Candidates interfering with the proper conduct of the examinations are warned by the invigilator or expelled from the examination room in a serious case. Under such circumstances, a report is

submitted to HKIB to consider whether disciplinary action should be taken. Disciplinary action includes, but is not limited to, candidate disqualification.

-  Candidates cannot leave the examination room during the first 45 minutes and the last 15 minutes of an examination. Candidates who decide to leave early must notify the invigilator as quietly as possible and are not allowed to re-enter the examination room.
-  Candidates must stop writing when instructed to do so by the invigilator.
-  Candidates must not detach any part of their answer sheet, or remove their answer sheet, wholly or partly, from the examination room.
-  Candidates are not allowed to communicate with other candidates during an examination. They are also prohibited from communicating with third parties outside the examination room by using any electronic device. The invigilator has the right to expel candidates from the examination room if their behaviour interferes with the proper conduct of the examination. Any candidate attempting to copy from another candidate's script or any other source is disqualified.
-  Pocket calculators: Financial calculators may be used and listed below:

Calculator Model
<ul style="list-style-type: none"> • Texas Instruments: BA II Plus (both versions), including the BA II Plus Professional • Hewlett Packard: HP 10B, HP 10bII, HP 10bII+, HP12C (including the HP 12C Platinum and the Anniversary Edition), HP 12C Prestige, HP 17bII+, HP20B • Sharp: Sharp Business/Financial Calculator EL-733, EL-733a • Casio: FC 100/FC 100V/FC 200/FC 200V

Newer and older versions of these calculators will be allowed to bring into the examination room

HKIB strictly enforces all policies with regard to calculator usage during examinations and candidates are required to abide by the policies of HKIB. Calculators are inspected prior to the start of the exam. They must remain on your desk in full view and proctors continue to inspect calculators throughout the administration of the examination. Possession or use of an unauthorised calculator at the test centre results in the voiding of your examination results and may lead to the suspension or termination of your candidacy in HKIB Programme. Failure by the proctors to detect an unauthorised calculator prior to the start of the examination, or your use of an unauthorised calculator at any time during the examination, does not imply that the calculator is an approved model or that your scores will ultimately be reported. Calculator covers, keystroke cards, and

loose batteries are permitted in the examination room; instruction manuals are not allowed.



Candidates are required to clear the financial calculator memory prior to each session of the examination (Please do not ask invigilators to clear it.). It is the candidates' responsibility to revert their own calculator to desired setting(s) once the calculator's memory has been cleared. If a candidate's calculator has notes/formulas printed on the back of the calculator, includes pull-out cards or contains other supplemental material, this information must be removed or masked by solid colour tape before entering the examination room.



If any candidate infringes any of the above regulations, he/she is liable to disciplinary actions, including disqualification.

9. Certification Application and Renewal Process

9.1 Certification Application

Relevant Practitioners who have completed Modules 1 to 4 of the ECF-Fintech (Core Level) Programme and obtained a pass in the relevant examinations plus at least 1 year of relevant working experience in Fintech projects and / or any of the Core Level functions in Fintech Solution Development, Fintech Product Design, Fintech Strategy and Management or Regtech as specified in Annex 1 of the HKMA [Guide to Enhanced Competency Framework on Fintech](#) may apply for Certification "Associated Fintech Professional (CPFinT(A))" with HKIB professional membership.

Relevant Practitioners who have completed Modules 5, 9 and 10 of the ECF-Fintech (Professional Level) Programme and obtained a pass in the relevant examinations plus at least 3 years of relevant work experience in Fintech projects and / or any of the Professional Level functions in Fintech Solution Development, Fintech Product Design, Fintech Strategy and Management or Regtech as specified in Annex 1 of the HKMA [Guide to Enhanced Competency Framework on Fintech](#) may apply for Certification "Certified Fintech Professional (Management) (CPFinT(M))" with HKIB professional membership.

Relevant Practitioners who have completed Modules 5 plus Modules 6 / Modules 5 plus Modules 7 / Modules 5 plus Modules 8 / Modules 5 plus Modules 11 of the ECF-Fintech (Professional Level) Programme and obtained a pass in the relevant examinations plus at least 3 years of relevant work experience in Fintech projects and / or any of the Professional Level functions in Fintech Solution Development, Fintech Product Design, Fintech Strategy and Management or Regtech as specified in Annex 1 of the HKMA [Guide to Enhanced Competency Framework on Fintech](#) may apply for Certification(s) "Certified Fintech Professional (Specialist – Artificial Intelligence and Big Data Stream) (CPFinT(S-AIBD))" or "Certified Fintech Professional (Specialist - Distributed Ledger Technology Stream) (CPFinT(S-DLT))" or "Certified Fintech Professional (Specialist - Open Banking and Application Programming Interface Stream) (CPFinT(S-OBAPI))" or "Certified Fintech Professional (Specialist - Regtech Stream) (CPFinT(S-RT))" with HKIB professional membership.

Applicants are required to submit a completed Certification Application Form to HKIB

together with the relevant supporting documents and payment of the required certification fee. The Certification Application form can be obtained from HKIB website.

Certification holders are registered as Certified Individuals and included in the public register on HKIB website. Upon successful application for the above Certification(s), professional membership is also granted by HKIB.

9.2 Certification Renewal

Certification of Associated Fintech Professional (CPFinT(A)), Certified Fintech Professional (Management) (CPFinT(M)), Certified Fintech Professional (Specialist - Artificial Intelligence and Big Data Stream) (CPFinT(S-AIBD)), Certified Fintech Professional (Specialist - Distributed Ledger Technology Stream) (CPFinT(S-DLT)), Certified Fintech Professional (Specialist - Open Banking and Application Programming Interface Stream) (CPFinT(S-OBAPI)) or Certified Fintech Professional (Specialist - Regtech Stream) (CPFinT(S-RT)) are subject to annual renewal by HKIB.

Relevant Practitioners are required to comply with the annual Continuing Professional Development (CPD) Scheme in order to renew their Certification. The requirement is a minimum of 12 verifiable CPD hours, of which at least 4 must be earned from activities related to topics of innovative technology (e.g. artificial intelligence, big data, cloud computing, cybersecurity, distributed ledger technology, and / or open banking and API), product development, business strategy and marketing, finance and investment, and / or risk and compliance.


The remaining hours should be on training topics related to banking and finance, Fintech, or the job function. Examples of appropriate training topics include:

- a) Compliance, code of conduct, professional ethics or risk management;
- b) Banking and financial knowledge;
- c) Emerging technologies in financial services (e.g. machine learning algorithms, deep learning, network analytics, visualisation, voice recognition, natural language processing and generation);
- d) Economics;
- e) Accounting;
- f) Legal principles;






- g) Business and people management;
- h) Language; and
- i) Information technology.

Certification holders are required to renew their certification registration annually in January. Renewal email will be sent to members before renewal deadline. Certification holders who do not pay the continuing membership subscription on or before 31 January of each calendar year are treated as Default Members.

9.3 Certification Fee and Payment

-  The application fee for certification in various categories are as follows: (Valid until 31 December 2024)

Certification	First year certification - Non-HKIB member: HKD1,800 - Current HKIB ordinary member: HKD620 - Current HKIB professional member: Waived
Certification Renewal	Annual Fee - Certification: HKD1,800 - Reinstatement fee of default member: HKD2,000

-  Applicants should pay the Certification Fee and Certification Renewal Fee as follows:
 - (a) Paid by Employer.
 - (b) By credit card. Please provide your credit card information on the application form.
 - (c) By FPS payment. Please provide your FPS payment receipt.
-  Application forms without payment instruction are **NOT** processed.
-  **NO** fees are refunded or transferred under any circumstances.
-  Applicants are advised to keep a record of their payment.
-  HKIB reserves the right to adjust the certification, re-certification and / or administration surcharge fees (if applicable), at any time.

9.4 Certification and HKIB Membership Regulations

It is mandatory for all individuals to maintain a valid membership status with HKIB if the applicants want to apply for and maintain certification and be subject to HKIB membership governance.

Once an application is processed, the membership subscription and registration fees are non-refundable and non-transferable.

The name of the member to be entered on HKIB's records is that on the certification application form. This name, and the order and spelling in which it is presented are used subsequently on all transcripts, pass lists, diplomas, and certificates except where a member has notified HKIB of any change. Such notification must be accompanied by a certified true copy⁷ of documentary confirmation, e.g. Hong Kong Identity Card, birth certificate, statutory declaration, etc.

Certification holders are bound by the prevailing rules and regulations of HKIB. They are abided by HKIB's rules and regulations in HKIB Members' Handbook. Certification holders are required to notify HKIB of any material changes to any information provided and responses made in certification application, including their contact details. HKIB may investigate the statements certification holders made with respect to applications, and applicants may be subject to disciplinary actions for any misrepresentation (whether fraudulent and otherwise) in their applications.

9.5 Membership Reinstatement

Members who have not paid the membership/certification fees when due shall be considered as default members and are not entitled to use any HKIB Professional Qualification and neither may call themselves members of the Institute.

Default members who reinstate their membership with HKIB are required to pay the current year's membership fee plus a reinstatement fee. Once the membership is reinstated, the member's examination record, if any, is reactivated.

⁷ Submitted copies of documents to HKIB must be certified as true copies of the originals by:

- HKIB designated staff; or
- HR / authorized staff of current employer (Authorized Institution); or
- A recognized certified public accountant / lawyer / banker / notary public; or
- Hong Kong Institute of Chartered Secretaries (HKICS) member.

The certifier must sign and date the copy document (printing his/her name clearly in capital letters underneath) and clearly indicate his/her position on it. The certifier must state that it is a true copy of the original (or words to similar effect).

10. Exemption Application and Regulations

10.1 Modular Exemption Requirements

Exemption for specific modules of the “Associated Fintech Professional (CPFinT(A))” will be granted for practitioners who have passed any of the following training / professional programme(s):



Module	Training Programme (University Degree)	Programme Provider
Module 1	BEng Fintech	Chinese University of Hong Kong
	MSc Fintech	Chinese University of Hong Kong
	BSc Computational Finance and Financial Technology	City University of Hong Kong
	Associate of Science (Financial Technology)	College of International Education, Hong Kong Baptist University
	MSc Finance (Fintech and Financial Analytics)	Hong Kong Baptist University
	BBA (Hon) Financial Technology and Innovation	Hong Kong Metropolitan University
	BSc (Hon) Financial Technology and Artificial Intelligence	Hong Kong Polytechnic University
	Doctor Financial Technology	Hong Kong Polytechnic University
	BCom (Hon) in Financial Technology	Hong Kong Shue Yan University
	MSc Fintech	Hong Kong University of Science and Technology
	Advanced Diploma in FinTech	HKU SPACE
	Executive Certificate in FinTech	HKU SPACE
	Executive Certificate in Banking and Financial Technology	HKU SPACE
	BASc Financial Technology	University of Hong Kong
	MSc Fintech	University of Hong Kong
MSc Financial Technology and Data Analytics	University of Hong Kong	








	Training Programme (Online Courses)	Programme Provider
	Harvard Fintech Online Short Course with Harvard VPAL Premier Certificate	Harvard University
	FinTech: Finance Industry Transformation and Regulation Specialization of Coursera	Hong Kong University of Science and Technology
	Fintech: Innovation and Transformation in Financial Services	National University of Singapore
	The Future of Finance Professional Certificate of edX	University of Texas
	Professional Programme	Programme Provider
	Shenzhen-Hong Kong-Macau Fintech Professional Programme Level 1	Shenzhen Fintech Association, Chinese Financial Association of Hong Kong, and Macau Institute of Financial Services
	Certificate in Finance and Technology Level 1	Institute of Financial Technologists of Asia
Module 2	Training Programme (University Degree)	Programme Provider
	BCom (Hon) in Financial Technology	Hong Kong Shue Yan University
	BBA (Hon) Financial Technology and Innovation	Hong Kong Metropolitan University
	Training Programme (Advanced Diploma)	Programme Provider
	Advanced Diploma for Certified Banker – "Fundamental of Banking", "Professional Ethics and Compliance", and "Risk Management"	The Hong Kong Institute of Bankers

	Advanced Diploma for Certified Banker – "Fundamental of Banking", and ECF- Operational Risk Management / ECF- Compliance – "Module 2: Regulatory Framework and Compliance in the Banking Industry"	The Hong Kong Institute of Bankers
Module 4	Training Programme (University Degree)	Programme Provider
	BEng Fintech	Chinese University of Hong Kong
	MSc Fintech	Chinese University of Hong Kong
	BSc Computational Finance and Financial Technology	City University of Hong Kong
	Associate of Science (Financial Technology)	College of International Education, Hong Kong Baptist University
	MSc Finance (Fintech and Financial Analytics)	Hong Kong Baptist University
	BSc (Hon) Financial Technology and Artificial Intelligence	Hong Kong Polytechnic University
	Doctor Financial Technology	Hong Kong Polytechnic University
	BCom (Hon) in Financial Technology	Hong Kong Shue Yan University
	MSc Fintech	Hong Kong University of Science and Technology
	Advanced Diploma in FinTech	HKU SPACE
	BASc Financial Technology	University of Hong Kong
	MSc Fintech	University of Hong Kong
	MSc Financial Technology and Data Analytics	University of Hong Kong
	OR	
	<p>A candidate who has completed at least one of the certifications in any one of the following specialist areas from key market players or service/platform providers is eligible to apply for exemption on Module 4 of the ECF- Fintech Core Level training programme:</p> <ul style="list-style-type: none"> - <u>Artificial Intelligence and Big Data Analytics</u>: e.g. AWS Machine Learning - Specialty, Microsoft AI Engineer, AWS Data Analytics - Specialty, Microsoft Data Engineer, Microsoft Data scientist, Google Data Analytics, etc. 	

	<ul style="list-style-type: none"> - <u>Cloud Computing for Business Applications</u>: e.g. AWS Certified Cloud Practitioner, GCP Associate Cloud Engineer, Alibaba Cloud Certified Associate-Cloud Computing, Microsoft Certified: Azure Fundamentals, etc. - <u>Blockchain and Distributed Ledger Technology</u>: e.g. Blockchain Certification Course (from EC Council), P. G. Diploma in Blockchain Technology (from UpGrad), Certified Enterprise Blockchain Architect (CEBA), Blockchain Technology - EdX, Blockchain Fundamentals Certificate (from ISACA), etc.
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10.2 Modular Exemption Application

-  Candidate with relevant qualifications may apply for module exemption from “Professional Certificate for ECF-Fintech”.
-  Exemption application should be made on an exemption form together with the following documents/items; failing to do so delays assessment:
 - i. Appropriate fees (application fee and exemption fees)
 - ii. Copies of transcript and certificate, if applicable

Note: Candidates are required to submit the exemption form ONLY if they attended the training and completed the examination offered by HKIB.
-  Documents submitted will not be returned regardless of the application result.
-  Unless otherwise specified, exemption application based on partially attained qualification is not accepted.
-  Exemption claims granted to student members are only registered in HKIB’s record upon the student members’ graduation.
-  Exemption results are normally given in writing within 60 days after receipt of application and supporting documents. If further assessment is needed due to unexpected circumstances, separate notifications are given. The decision of the Institute is final and cannot be appealed.
-  Candidate attempting but failing in a module may subsequently claim exemption from that module if they obtain a new/further qualification recognised for exemption purposes.
-  An exemption confirmation letter is issued to candidate whose exemption application is granted.
-  Candidate exempted from a module subsequently attempting that module by examination, have their exemption status overridden.

11. General Information

11.1 Bad Weather Arrangements

In the event of bad weather on the training class/examination day, learners/candidates should pay attention to announcement made by the Hong Kong Observatory about weather conditions. They could also visit [HKIB website](#) for its announcements. For the respective individuals, they will be notified by SMS message about the latest arrangements.

Bad weather – Typhoon signal No. 8 or above, or the black rainstorm signal, or “extreme conditions” is hoisted.

For On-site Training

Signal in force	Bad Weather Arrangement
At or after 7am	Session <u>starts from 9:00am to 2:00pm</u> will be switched to virtual training class/event whenever possible.
At or after 12:00noon	Session <u>starts from 2:00pm to 6:00pm</u> will be switched to virtual training class/event whenever possible.
At or after 4:00pm	Session <u>starts from 6:00pm to 10:00pm</u> will be switched to virtual training class/event whenever possible.

For On-site Examination

Signal in force	Bad Weather Arrangement
At or after 7am	Session <u>starts from 9:00am to 2:00pm</u> will be rescheduled.
At or after 12:00noon	Session <u>starts from 2:00pm to 6:00pm</u> will be rescheduled.
At or after 4:00pm	Session <u>starts from 6:00pm to 10:00pm</u> will be rescheduled.

For Virtual Training / Remote Examination

Signal in force	Bad Weather Arrangement
At or after 7am	Session <u>starts from 9:00am to 2:00pm</u> will be continued as per schedule whenever possible.
At or after 12:00noon	Session <u>starts from 2:00pm to 6:00pm</u> will be continued as per schedule whenever possible.
At or after 4:00pm	Session <u>starts from 6:00pm to 10:00pm</u> will be continued as per schedule whenever possible.

11.2 Privacy Policy Statement

Personal data provided by the candidate are used for administrative and communicative purposes relating to training and examination. Failure to provide complete and accurate information may affect the provision of administrative services to the candidate. The Institute keeps the personal data provided confidential but may need to disclose it to appropriate personnel in the Institute and other relevant parties engaging in the provision of examination services to the Institute. Candidates have the right to request access to and correction of their personal data in writing to HKIB by using HKIB's email address of cs@hkib.org.

Candidates are advised to read the [Privacy Policy Statement](#) at HKIB website to understand their rights and obligations in respect of the supply of personal data to HKIB and the ways in which HKIB may handle such data.

11.3 Addendums and Changes

HKIB reserves the right to make changes and additions to membership, training and examination regulations, enrolment/application procedures, information in this handbook and any related policies without prior notice. HKIB shall bear no responsibility for any loss to candidates caused by any change or addition made to the aforementioned items.

12. Contact Information

HKIB Head Office Address

3/F Guangdong Investment Tower, 148 Connaught Road Central, Hong Kong



General Enquiries / Feedback

Tel.: (852) 2153 7800

Email: cs@hkib.org

Office Service Hours

Monday – Friday: 09:00 - 18:00 (except public holidays)