

## Financial Technology and digital innovation to modeRnise and develop cUrricula of VietnameSe and Philippines UniversiTies

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# MASTER IN FINTECH AND DIGITAL INNOVATION - Module Syllabus -





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## MASTER IN FINTECH AND DIGITAL INNOVATION - MODULE SYLLABUS -

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#### 1. Module details

Module Title	BIG DATA IN FINANCE
Credits	3 Vietnamese Credit Unit (5 ECTS approximately)
Hours	150 hours
N° of hours in presence	37.5 hours
N° of hours in distance learning	At least 15
Name of the leading institution	Ho Chi Minh City Open University

#### 2. Module description

This module aims to introduce students to financial data, analysis tools analysing statistical models from these datasets, especially- the module focuses on two areas those are developing rapidly in the financial sector: 1) credit analytics (predicting default in personal loans, mortgages, and firms); 2) asset management. Moreover, students also are able to analyse the other topic from different areas in finance such corporate finance, venture capital...The module is based on Python and its ecosystem of packages (students can employ the SAS enterprise on Python)

#### 3. Learning Outcomes

The course overall learning outcomes are:

Knowledge and Understanding:

- a. Demonstrates in-depth understanding of recent big data applications and issues in finance;
- b. Demonstrates an extraction of information and process for the decision-making based on large data sets;

Application and Problem-Solving Abilities:

- a. Applies a significant range of specialist database and software operating, programming and other FinTech relevant skills;
- b. Plans and executes significant research and development projects of financial technology;



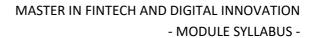
#### 4. Module knowledge, skills and competencies (EQF\*)

Moreover, at the end of this course, the student will be able to

- Understand the big data and applications in the financial sectors (e.g., commercial and investment banking, private equity, venture capital, asset management) and outside the financial sector (corporate financial decision, treasury).
- Manage large datasets using software.
- Classify, analyse/make initial inferences for the daily/professional purposes based on large data sets.
- Build and forecast/predict models within the financial-banking theories for professional purposes (patterns for decision-making; evaluation or predict the trend. etc.)

#### 5. Module lessons

Lesson N.	1
Lesson title	Big data introduction
Duration	28 hours (7 hours contact hours)
Specific objectives	Identify the big data definition.  Understand the big data and its challenges/issues: biased/discrimination, privacy, etc.
Topics	<ul> <li>+ Definition and concepts of big data/ AI/ Machine Learning.</li> <li>+ Applications of big data in different sectors.</li> <li>+ Critical role of big data in the financial areas.</li> <li>+ Issues of big data.</li> </ul>
In presence activity	Instructor presents the key concepts and asks students to work in a group to discuss the applications/issues of big data.  Students are required to search for the Cambridge Analytica data scandal to discuss.
Distance learning type of learning object /task	<ul> <li>Virtual classroom/ web-streaming conference</li> <li>Lecture note</li> <li>Individual report</li> </ul>





Other supporting material	Bernard Marr (2016). Big data in practice: how 45 successful companies used big data analytics to deliver extraordinary results. Wiley. ISBN:9781119278825
	José María Canvanillas, Edward Curry and Wolfgang Wahlster (2016). New horizons for a data-driven Economy. Springer International Publishing AG Switzerland. ISBN: 978-3-31921569-3.
	Carlos Castillo (2016). Big Crisis Data: Social Media in Disasters and Time-Critical Situations. Cambridge University Press. https://doi.org/10.1017/CBO9781316476840

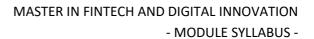
Lesson N.	2
Lesson title	Handling data
Duration	36 hours (9 hours contact hours)
Specific objectives	+ Understand the data format and styles.
	+ Design how to manage data.
	+ Describe the text processing in terms of finance.
	+ Identify the representation of data.
Topics	+ Classify the data (Structured and unstructured data) and file formats
	+ Manage the database by SQL.
	+ Define concepts of text processing and applications.
	+ Representing data.
In presence activity	Instructor presents the key theoretical concepts and explains the lesson.
	Students work in pairs to discuss the text processing application in financial aspects.





Distance learning type of learning object /task	<ul> <li>Audio/Video Lesson</li> <li>Virtual classroom/ web-streaming conference</li> <li>Lecture note</li> <li>Self-evaluation test</li> </ul>
Other supporting material	Salahaldin Juba and Andrey Volkov (2017). Learning PostgreSQL 10: A beginner's guide to building high-performance PostgreSQL data solutions. 2 <sup>nd</sup> edition. Packt Publishing. ISBN: 1788392019
	Silberzahn, R., et al. (2018) Many analysts, one data set: mining transparently how variations in analytic choices affect results. Advances in Methods and Practices in Psychological Science, https://doi.org/10.1177/2515245917747646

Lesson N.	3
Lesson title	Big data financial analytics
Duration	72 hours (18 contact hours)
Specific objectives	Modelling in financial big data
Topics	+ Neutral Networks in Finance
	+ Supervised Learning.
	+ Semi-supervised Learning
	+ Unsupervised learning.
	+ Factor models
	+ Data clustering
In presence activity	+ Instructor presents and discusses the definitions/concepts and gives examples of each model.
	+ Students discuss the advantages/disadvantages of models and work in groups to identify their types of project





	(suggest using the SAS enterprises in Python to prepare/R or Python).  + Students are required to present a group assignment on how to employ the data cluster to build a model for asset management/portfolio management.
Distance learning type of learning object /task	<ul> <li>Audio/Video Lesson</li> <li>Virtual classroom/ web-streaming conference</li> <li>Lecture note</li> <li>Self-evaluation test</li> <li>Group assignments.</li> </ul>
Other supporting material	Irene Aldridge and Marco Avellaneda (2021) Big data science in finance. Wiley & Son. ISBN 9781119602996  Vignesh Prajapati (2013). Big data Analytics with A and Hadoop. Packt Publishing. ISBN 978-1-78216-328-2

Lesson N.	4
Lesson title	Application of big data in mortgages
Duration	14 hours (3.5 contact hours)
Specific objectives	<ul><li>+ Understand the process of big data and its application.</li><li>+ Be able to build a model to analyse.</li></ul>
Topics	+ Practice the analysis of loan performance on mortgages
In presence activity	<ul> <li>+ Instructor provides the tools/explanation to access the Data Dynamics (from Fannie Mae).</li> <li>+ Students present how they handle the data sets and process for the specified purpose.</li> </ul>
Distance learning type of learning object /task	<ul><li>Video example</li><li>Lecture note</li><li>Group presentation</li></ul>



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Other supporting material	lain L. J. Brown (2014). Developing Credit Risk Models Using SAS Enterprise Miner and SAS/STAT: Theory and Application. Cary, NC: SAS Institute Inc. ISBN 978-1-62959-488-0
	Yves Hilpisch (2015). Python for finance: analyze big financial data. O'Reilly. ISBN: 978-1-491-94528-5