Bachelor of Arts and Sciences in Financial Technology [BASc(FinTech)]

SYLLABUS

The syllabus applies to students admitted in the academic year 2019-20 and thereafter under the four-year curriculum.

Curriculum

The Curriculum comprises 240 credits of courses as follows:

University Requirements

Students are required to complete:

a) 12 credits in language enhancement courses, including 6 credits in an English in the Discipline course, “CAES9542 Technical English for Computer Science” and 6 credits in Chinese language enhancement course, “CENG9001 Practical Chinese for engineering students”; and

b) 24 credits of courses in the Common Core Curriculum, comprising at least one course from each Area of Inquiry during the whole period of study.

BASc Core Courses

Students are required to complete 18 credits of BASc core courses.

Major in Financial Technology

Students are required to complete:

a) Discipline Core Courses (54 credits)

b) Discipline Elective Courses (30 credits)

c) Capstone experience (12 credits)

Elective Courses

Students are required to complete 90 credits of elective courses offered by any department, except for Common Core Courses.

The details of the distribution of the above course categories are as follows:

University Requirements (36 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>No. of credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAES9542</td>
<td>Technical English for Computer Science</td>
<td>6</td>
</tr>
<tr>
<td>CENG9001</td>
<td>Practical Chinese for Engineering Students</td>
<td>6</td>
</tr>
<tr>
<td>CC##XXXXX</td>
<td>University Common Core Course (4 courses)*</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total for UG5 Requirements</strong></td>
<td></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

* Students have to complete 24 credits of courses in the Common Core Curriculum, comprising at least one course from each Area of Inquiry during the whole period of study.

BASc Core Courses (18 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>No. of credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASC9001</td>
<td>Foundations of human knowledge</td>
<td>6</td>
</tr>
<tr>
<td>DESN9001</td>
<td>Leadership beyond borders</td>
<td>6</td>
</tr>
<tr>
<td>STAT1015</td>
<td>Introduction to data science</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total for BASc Core Courses</strong></td>
<td></td>
<td><strong>18</strong></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course</td>
<td>No. of credits</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>ENGG1330</td>
<td>Computer programming I</td>
<td>6</td>
</tr>
<tr>
<td>ELEC2543 /</td>
<td>Object-oriented programming and data structures</td>
<td>6</td>
</tr>
<tr>
<td>FITE2000</td>
<td>Foundations of FinTech Programming</td>
<td></td>
</tr>
<tr>
<td>FITE1010</td>
<td>Introduction to financial technologies</td>
<td>6</td>
</tr>
<tr>
<td>MATH1853</td>
<td>Linear algebra, probability and statistics</td>
<td>6</td>
</tr>
<tr>
<td>STAT1603</td>
<td>Introductory statistics</td>
<td>6</td>
</tr>
<tr>
<td>ACCT1110</td>
<td>Introduction to financial accounting</td>
<td>6</td>
</tr>
<tr>
<td>ECON1210</td>
<td>Introductory microeconomics</td>
<td>6</td>
</tr>
<tr>
<td>FINA1310</td>
<td>Corporate finance</td>
<td>6</td>
</tr>
<tr>
<td>LLAWS069</td>
<td>Regulation of financial markets</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total for Discipline Core Courses** 54

**Discipline Elective Courses (30 credits)**

6 credits of courses to be chosen from the following list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>No. of credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLAWS050</td>
<td>Introduction to information technology law</td>
<td>6</td>
</tr>
<tr>
<td>LLAWS044</td>
<td>Alternative Finance</td>
<td>6</td>
</tr>
<tr>
<td>LLAWS054</td>
<td>Law, Innovation, Technology and Entrepreneurship (LITE)</td>
<td>6</td>
</tr>
<tr>
<td>LLAWS055</td>
<td>Law, Innovation, Technology and Entrepreneurship (LITE) Internship</td>
<td>6</td>
</tr>
</tbody>
</table>

24 credits of courses to be chosen from the following list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>No. of credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP314 /</td>
<td>Machine learning / Artificial intelligence and deep learning</td>
<td>6</td>
</tr>
<tr>
<td>ELEC4544</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP322</td>
<td>Modern technologies on World Wide Web</td>
<td>6</td>
</tr>
<tr>
<td>COMP340</td>
<td>Applied deep learning</td>
<td>6</td>
</tr>
<tr>
<td>COMP355</td>
<td>Cyber security</td>
<td>6</td>
</tr>
<tr>
<td>COMP359</td>
<td>Artificial intelligence applications</td>
<td>6</td>
</tr>
<tr>
<td>FINA2320</td>
<td>Investments and portfolio analysis</td>
<td>6</td>
</tr>
<tr>
<td>FINA2322</td>
<td>Derivatives</td>
<td>6</td>
</tr>
<tr>
<td>FINA3350</td>
<td>Mathematical finance</td>
<td>6</td>
</tr>
<tr>
<td>FINA3353</td>
<td>Regulatory and operational issues in finance</td>
<td>6</td>
</tr>
<tr>
<td>FINA4350</td>
<td>Text analytics and natural language processing in finance and fintech</td>
<td>6</td>
</tr>
<tr>
<td>FITE3010</td>
<td>Big data and data mining</td>
<td>6</td>
</tr>
<tr>
<td>FITE3011</td>
<td>Distributed ledger and blockchain</td>
<td>6</td>
</tr>
<tr>
<td>FITE3012</td>
<td>E-payment and crypto-currency</td>
<td>6</td>
</tr>
<tr>
<td>ENGL1015</td>
<td>Introduction of English linguistics</td>
<td>6</td>
</tr>
<tr>
<td>ENGL2050</td>
<td>English corpus linguistics</td>
<td>6</td>
</tr>
<tr>
<td>PSYC1004</td>
<td>Introduction to quantitative methods in psychology</td>
<td>6</td>
</tr>
<tr>
<td>PSYC2007</td>
<td>Cognitive psychology</td>
<td>6</td>
</tr>
</tbody>
</table>

**Complete at least five Discipline Elective courses for a total of 30 credits** 30
Capstone Experience (12 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>No. of credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FITE4801</td>
<td>Project</td>
<td>12</td>
</tr>
</tbody>
</table>

Total for Capstone Experience 12

Electives (90 credits)

Any courses except Common Core Courses.

Summary of curriculum structure of BASc(FinTech)

<table>
<thead>
<tr>
<th>Course Categories</th>
<th>No. of credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Requirements</td>
<td>36</td>
</tr>
<tr>
<td>BASc Core Courses</td>
<td>18</td>
</tr>
<tr>
<td>Major in Financial Technology</td>
<td>96</td>
</tr>
<tr>
<td>Discipline Core Courses (54 credits)</td>
<td></td>
</tr>
<tr>
<td>Discipline Elective Courses (30 credits)</td>
<td></td>
</tr>
<tr>
<td>Capstone Experience (12 credits)</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
</tr>
</tbody>
</table>

A sample study plan is given as follows:

FIRST YEAR

University Requirements (12 credits)

CC##XXXX Two Common Core Courses 12

BASc Core Courses (12 credits)

BASC9001 Foundations of human knowledge 6
DESN9001 Leadership beyond borders 6

Discipline Core Courses (30 credits)

ENGG1330 Computer programming I 6
MATH1853 Linear algebra, probability and statistics 6
FITE1010 Introduction to financial technologies 6
ACCT1101 Introduction to financial accounting 6
ECON1210 Introductory microeconomics 6

Elective Course (6 credits)

SECOND YEAR

University Requirements (12 credits)

CC##XXXX Two Common Core Courses 12

BASc Core Course (6 credits)

STAT1015 Introduction to data science 6

Discipline Core Courses (18 credits)

ELEC2543 / Object-oriented programming and data structures / 6
FITE2000 Foundations of FinTech Programming
STAT1603 Introductory statistics 6
COURSE DESCRIPTIONS

Candidates will be required to do the coursework in the respective courses selected. Not all courses are offered every semester.

University Requirements on Language Enhancement Courses

CAES9542. Technical English for Computer Science (6 credits)

This one-semester, 6-credit communication course is for final-year students majoring in Computer Science / Computing and Data Analytics / Financial Technology [BASc(FinTech)]. The focus of this course is on helping students to report on the progress of their Final Year or Capstone Project in an effective, professional manner in both written and oral communication. Topics include accessing, abstracting, analyzing, organizing and summarizing information; making effective grammatical and lexical choices; technical report writing; and technical presentations. Assessment is wholly by coursework.

Co-requisite: COMP4801 or COMP4802 or COMP4804 or FITE4801
Assessment: 100% continuous assessment
CENG9001. Practical Chinese for engineering students (6 credits)

The course is designed to enable students to gain a mastery of the varieties of the Chinese language as used in the field of Engineering. It introduces students to various techniques for the effective use of practical Chinese. The course will familiarize students with traditional Chinese characters, simplified Chinese characters, modern Chinese grammar and rhetoric through outcomes-based assignments. Special training that is intended to sharpen students’ presentation skills in Cantonese and Putonghua will also be provided.

Assessment: 50% continuous assessment, 50% examination.

University Common Core Curriculum

Successful completion of 24 credits of courses in the Common Core Curriculum, comprising one course from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits:

- Scientific and Technological Literacy
- Humanities
- Global Issues
- China: Culture, State and Society

BASc Core Courses

DESN9001. Leadership beyond borders (6 credits)
Parts 1 & 2: Becoming Leaders and Global Leader Experience
The Becoming Leaders and Global Leader Experience parts of the courses aim to develop students’ ability to lead from a truly global perspective. Both will provide students with practical experiences that set them up to adapt and thrive in diverse situations, and also equip them with the tools needed to lead change, now and in the future.

Part 3: Leadership through Design Thinking
In this highly-connected world, our lives—already merged with businesses and societies—are faced with disruptiveness and challenges. We need relevant soft skills to adapt ourselves, to lead others, or to bring impact to communities. The design thinking workshop introduces a distinctive problem solving framework at the theoretical level and how it can be positioned and in real world situations.

Assessment: 100% coursework

BASC9001. Foundations of human knowledge (6 credits)
How does knowledge emerge from different disciplines? What is the nature and limit of knowledge generated by different methods? This foundations course will open up an interdisciplinary discourse about knowledge building and integration in arts and humanities, social sciences, and sciences. It will consist of three parts:

1. A philosophical and historical perspective of human knowledge.
   In this part students will engage in debates about the nature of knowledge, ways of knowing, and integrating knowledge. Students will also study how certain forms of knowledge formation have become dominant in our society, and learn how humans have come to know what we know today about ourselves and our planet.
2. From knowledge to judgement.
Knowledge is not just about information and facts. Knowledge calls for wisdom to interpret data and to make decisions about how to act upon them; it also requires critical reflections about the human condition and our roles and responsibilities as individuals and as a collective. In this part of the course, we will examine moral principles and ethical dilemmas during the process of building and responding to knowledge.

3. Knowledge sharing.
We will look at traditional and creative methods of knowledge dissemination, and explore opportunities and challenges in knowledge transfer in the information society. This course will help students build a solid foundation on knowledge creation, sharpen their critical thinking skills when they confront new information and ideas, and prepare them to become effective analysts and communicators of knowledge.

Assessment: 100% coursework

STAT1015. Introduction to data science (6 credits)
The course introduces basic concepts and methodology of data science to junior undergraduate students. The teaching is designed at a level appropriate for all undergraduate students with various backgrounds and without pre-requisites.

Students will engage in a full data work-flow including collaborative data science projects. They will study a full spectrum of data science topics, from initial investigation and data acquisition to the communication of final results.

Specifically, the course provides exposure to different data types and sources, and the process of data curation for the purpose of transforming them to a format suitable for analysis. It introduces elementary notions in estimation, prediction and inference. Case studies involving less-manicured data are discussed to enhance the computational and analytical abilities of the students.

Assessment: 100% coursework

Discipline Core Courses

ACCT1101. Introduction to financial accounting (6 credits)
The purpose of this course is to introduce students to the concepts of financial accounting and its underlying assumptions. This introductory accounting course is designed for students with no prior academic knowledge of accounting and is suited for both accounting and non-accounting majors. We will discuss the preparation, use and limitations of financial statements. The presentation will consist of moderately technical expositions of concepts and material. Throughout the course, we will illustrate applications of accounting principles with real examples.

Assessment: 50% continuous assessment, 50% examination

ECON1210. Introductory microeconomics (6 credits)
An introduction to the basic concepts and principles of microeconomics – the study of demand and supply, consumer theory, cost and production, market structure, incentives, and resource allocation efficiency, political economy, and ethics and public policy.
ELEC2543. Object-oriented programming and data structures (6 credits)
This course aims to provide a hands-on and in depth survey of object oriented programming paradigm, and the basic concepts of data structures through the Java programming language. It serves to provide a solid foundation of essential concepts on object oriented programming and data structures that will be required in its sequels —including the Systems and Network Programming (Level-2), Distributed Computing Systems (Level-3) or Embedded Systems (Level-3).
Specifically, the course covers the following topics: basics of the Java development environment; Java applications and applets; Java syntaxes; control structures; methods in Java; iteration; recursion; objects; classes; interfaces; inheritance; polymorphism; overloading; overriding; wrapper classes; type conversions; strings; string manipulations in Java; Java exceptions; try blocks; throwing and catching exceptions in Java; byte and character streams; stream classes; file classes; file manipulation in Java; arrays; dynamic memory allocation; dynamic data structures including the dynamically linked lists, stacks, queues, trees, graphs, hash tables; sorting; searching; examples of Java applications.
Pre-requisite: ENGG1111 or ENGG1330
Mutually exclusive with: ELEC1502, COMP2396, ELEC1503
Assessment: 50% continuous assessment, 50% examination

ENGG1330. Computer programming I (6 credits)
This is an introductory course designed for first-year engineering students to learn about computer programming. Students will acquire basic Python programming skills, including syntax, identifiers, control statements, functions, recursions, strings, lists, dictionaries, tuples and files. Searching and sorting algorithms, such as sequential search, binary search, bubble sort, insertion sort and selection sort, will also be covered.
Assessment: 70% continuous assessment, 30% examination

FINA1310. Corporate finance (6 credits)
This is an introductory finance course that develops the basic concepts and tools applicable to corporate financial decisions. Two main tasks of financial managers are studied: project evaluation and financing decisions. Specific topics include present value calculation, valuation of stocks and bonds, investment criteria and capital budgeting, risk and return, cost of capital, and capital structure.
Corporate ethics is also incorporated in the discussions.
Pre-requisite: ACCT1101
Mutually exclusive with: STAT3904
Assessment: 45% continuous assessment, 55% examination

FITE1010. Introduction to financial technologies (6 credits)
An introduction to the basic concepts of financial technologies, such as e-payment system, cryptocurrency, blockchain, data mining, and artificial intelligence.
Assessment: 40% continuous assessment, 60% examination
FITE2000. Foundations of FinTech Programming (6 credits)

This course introduces concepts and applications of basic data structures. Commonly used data structures, which include stacks and queues, trees, lists, arrays and graphs, will be discussed. Basic algorithms, both recursive and non-recursive, to manipulate these data structures will also be discussed. Basic object-oriented programming principles, which are abstraction, encapsulation, inheritance and polymorphism, will be introduced. The practical work of the course will use the object-oriented programming language Java and the Java Collections. Students will be required to apply the data structures using the Java Collections classes to solve practical and/or FinTech problems.

Pre-requisite: ENGG1330 or COMP1117
Mutually exclusive with: COMP2396 and ELEC2543
Assessment: 50% continuous assessment, 50% examination

LLAW3069. Regulation of financial markets (6 credits)

This foundation course addresses the nature and operation of financial markets and the role of regulation. Coverage, based on comparative analysis and international standards, will include major financial sectors (banking, securities, insurance), supporting legal and institutional structures, and current issues and trends.

Assessment: 100% take home examination

MATH1853. Linear algebra, probability and statistics (6 credits)

As the complementary course of MATH1851, students will be introduced to more topics of mathematics commonly applied in engineering so that students could be further enhanced with a concrete skill in mathematics underpinned for different engineering subjects. The course emphasizes mathematical concepts, principles, analysis, and their relationship to the modelling of engineering systems. Students could be furnished with the essential mathematical skills to analytically tackle some typical engineering problems to prepare for all the engineering subjects.

Pre-requisite: Level 2 or above in Extended Module 1, or Extended Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011. (This course is exclusively for Engineering students.)
Assessment: 20% continuous assessment; 80% examination

STAT1603. Introductory statistics (6 credits)

The discipline of statistics is concerned with situations involving uncertainty and variability. The interpretation of data needs special techniques when variability plays a role, as it usually does. Thus statistics forms an important descriptive and analytical tool of many scientific disciplines. Candidates with a mathematical background will find this course suitable, because the language of mathematics allows the subject of statistics to be presented with economy and clarity.

Pre-requisite: Level 2 or above in HKDSE Mathematics Extended Module 1 or 2 or equivalent
Co-requisite: MATH1009 or MATH1011 or MATH1013 or MATH1851 or MATH1853
Mutually exclusive with: STAT1601, STAT1602, STAT2601, STAT2901
Assessment: 25% continuous assessment; 75% examination
**Discipline Elective Courses**

**COMP3314. Machine learning (6 credits)**

This course introduces algorithms, tools, practices, and applications of machine learning. Topics include core methods such as supervised learning (classification and regression), unsupervised learning (clustering, principal component analysis), Bayesian estimation, neural networks; common practices in data pre-processing, hyper-parameter tuning, and model evaluation; tools/libraries/APIs such as scikit-learn, Theano/Keras, and multi/many-core CPU/GPU programming.

Prerequisite: MATH1853 or MATH2101; and COMP2119 or ELEC2543 or FITE2000
Assessment: 50% continuous assessment, 50% examination

**COMP3322. Modern technologies on World Wide Web (6 credits)**

Selected network protocols relevant to the World Wide Web (e.g., HTTP, DNS, IP); World Wide Web; technologies for programming the Web (e.g, HTML, XML, style sheets, PHP, JavaScript, Node.js.; other topics of current interest (AJAX, HTML5, web services, cloud computing).

Prerequisite: COMP1117 or ENGG1330 or ENGG1111 or ENGG1112
Mutually exclusive with: IIMT3663
Assessment: 60% continuous assessment, 40% examination

**COMP3340. Applied deep learning (6 credits)**

An introduction to algorithms and applications of deep learning. The course helps students get hands-on experience of building deep learning models to solve practical tasks including image recognition, image generation, reinforcement learning, and language translation. Topics include: machine learning theory; optimization in deep learning; convolutional neural networks; recurrent neural networks; generative adversarial networks; reinforcement learning; self-driving vehicle.

Prerequisites: COMP2119 or ELEC2543 or FITE2000; and MATH1853
Assessment: 50% continuous assessment, 50% examination

**COMP3355. Cyber security (6 credits)**

This course introduces the principles, mechanisms and implementation of cyber security and data protection. Knowledge about the attack and defense are included. Topics include notion and terms of cyber security; network and Internet security, introduction to encryption: classic and modern encryption technologies; authentication methods; access control methods; cyber attacks and defenses (e.g. malware, DDoS).

Prerequisites: COMP2119 or ELEC2543 or FITE2000
Mutually exclusive with: ELEC4641
Assessment: 50% continuous assessment, 50% examination
COMP3359. Artificial intelligence applications (6 credits)

This course focuses on practical applications of AI technologies. The course comprises two main components: students first acquire the basic know-how of the state-of-the-art AI technologies, platforms and tools (e.g., TensorFlow, PyTorch, scikit-learn) via self-learning of designated materials including code examples and open courseware. Students will then explore practical AI applications and complete a course project which implements an AI-powered solution to a problem of their own choice. This course is designed for students who are interested in experimenting with some typical AI problems before delving deeper into the AI foundations and theories.

Pre-requisite: ENGG1340 or COMP2113 or FITE2000
Assessment: 70% continuous assessment, 30% examination

ELEC4544. Artificial intelligence and deep learning (6 credits)

This course aims at providing students with a basic understanding on deep learning technology. The topics to be covered are neural network, backpropagation, deep auto-encoder, Restricted Boltzmann Machines (RBM), Convolutional Neural Network (CNN), Multi-Layer Perceptron (MLP), strategies for training deep architectures, handling overfitting, cross-validation, meta-heuristic searching for parameter tuning. This is followed by hands-on implementation of deep learning algorithms using Python, with applications ranging from image classification, speech processing, and financial data analysis.

After finish the course, students will be able to
1. Master the basic concept of deep learning in artificial intelligence. 2. Master the Python programing language for implementing deep learning model. 3. Apply deep learning in novel applications.

Pre-requisite: ELEC3241 Signals and linear systems
Assessment: 50% continuous assessment, 50% examination

FINA2320. Investments and portfolio analysis (6 credits)

This course introduces students to the fundamental principles of investments and to major issues currently of concern to all investors. The concepts and skills developed from this course enable students to conduct a sophisticated assessment of current issues and debates covered by both the popular media as well as more-specialized finance journals. We emphasize on equity part and the main topics include: portfolio theory, equilibrium in capital markets, equity valuation, portfolio performance evaluation, and relevant institutional details. The risk and return analysis and portfolio theory provide corporate leaders (CEOs and CFOs) with knowledge on how to make investment decisions to optimize the trade-off between risk and return. Students are strongly recommended that they should first complete at least one undergraduate level statistics course before taking this course; otherwise, students may have great difficulty in understanding the statistical analysis of financial models in this course.

Pre-requisites: ECON1001/ ECON1210; and FINA1003/FINA1310
Co-requisites: One of the following prescribed statistics course:
ECON1003/ ECON1280 or STAT0302/ STAT1602 or STAT1306/ STAT1603
Mutually exclusive with: STAT 2309/ STAT3609 and STAT3806/ STAT3952
Assessment: 50% continuous assessment, 50% examination
FINA2322. Derivatives (6 credits)

The major objective of this course is to promote an in-depth understanding of basic derivatives. Derivatives have become a popular hedging and investment tool over the last several decades and derivatives concepts are required for every advanced finance topic. This course provides students with a framework to understand the fundamental concepts of derivative products (forward and futures, options, swaps, and basic structured products), to develop the necessary skills used in valuing derivative contracts, and to understand a wide variety of issues related to risk management and investment decisions using derivatives.

Pre-requisites: ECON1001/ECON1210 and FINA1003/FINA1310
Mutually exclusive: IMSE3010/IMSE4110; STAT2820/STAT3905; STAT3303/STAT3618, and STAT2812/STAT3910
Remarks: NOT OPEN to students taking or having taken MATH2906/MATH3906
Assessment: 45% continuous assessment; 55% examination

FINA3350. Mathematical finance (6 credits)

This course provides students with the necessary mathematical techniques used in continuous-time finance. It covers stochastic calculus, partial differential equation and applied probability. After taking this course, one should be able to fully understand no-arbitrage theory, the Black-Scholes equation, risk-neutral probability and martingales. The purpose of this course is to lay down a solid mathematical foundation for students to learn more advanced topics in financial engineering and risk management, such as exotic options, interest rate derivatives and credit risk models.

Pre-requisites: FINA0301/FINA2322
Mutually exclusive with: MATH2906/MATH3906
Assessment: 40% continuous assessment, 60% examination

FINA3353. Regulatory and operational issues in finance (6 credits)

This course examines with students a number of practical issues in quantitative finance, more specifically, how practices by market participants are affected by regulations and the regulatory environment.

Regulations from the macro regulatory environment are then transformed into operational practices in financial markets and its respective institutions. In this course, the macro regulatory issues are discussed in class while operational issues are examined in the context of life cases.

The course is put together with a blend of concepts, theories and frameworks as well as practices. The course focuses on how issues (risks) from operations are addressed through personal ethics, professional codes and industry best practices, as well as regulations, compliance and its related costs, put together by regulatory bodies such as central banks, securities exchange commissions etc. at the local level, and, BIS, Basel, etc. at the global level.

Pre-requisites: FINA0301/FINA2322; and FINA2802/FINA2320 or STAT2309/STAT3609
Assessment: 50% continuous assessment, 50% examination
FINA4350. Text analytics and natural language processing in finance and fintech (6 credits)

This course covers the main elements of natural language processing (NLP), text analytics, and text mining, providing students with a foundation in collecting, managing, and analyzing textual data with financial and economic applications in mind, such as FinTech. Examples of potential applications include understanding and responding to sentiment in financial newspapers and social media, using social media to improve performance in asset/investment management, due diligence, Fed watching, monitoring of company events, and detecting insider trading. Although students write their own computer programs in this course, they are not required to implement most algorithms from scratch. Instead, the focus of this course is on how to use existing state-of-the-art open-source software libraries and how to apply them in a financial context. This course consists of three parts. In the first part, we work with real-world textual data sets to obtain proficiency in collecting, importing, organizing, and cleaning textual data from sources related to finance and economics. Among others, we cover web scraping, textual corpora, text processing, tokenization, stemming, and stop word removal. In the second part we delve into a more detailed analysis of NLP, text analytics, and machine learning with a particular focus on FinTech. For instance, we examine bag-of-words, word weighting schemes, document classification, document clustering, sentiment analysis, and topic models. The third part consists of summarizing, displaying, and visualizing results obtained from NLP and text analytics for applications in finance and economics.

Pre-requisites: ECON2280 Introductory Econometrics
Assessment: 70% continuous assessment, 30% examination

FITE3010. Big data and data mining (6 credits)

The goal of the course is to study the main methods used today for data mining and on-line analytical processing. Topics include Big Data Architecture, Data Mining Algorithms, Classification, and Clustering.

Prerequisite: FITE1010 or MATH1853 or MATH2101; and COMP2119 or ELEC2543 or FITE2000
Assessment: 40% continuous assessment, 60% examination

FITE3011. Distributed ledger and blockchain (6 credits)

This course introduces basic theories of blockchain and distributed ledger, which includes basic cryptography, public key cryptosystem, distributed computing and consensus protocols. Financial applications of blockchain and distributed ledger will be discussed.

Prerequisite: FITE1010 or MATH1853 or MATH2101; and COMP2119 or ELEC2543 or FITE2000
Assessment: 40% continuous assessment, 60% examination

FITE3012. E-payment and crypto-currency (6 credits)

The course covers banking systems, e-payment security, foreign exchange, Internet banking, wireless payments, stored-value cards, micropayments, peer-to-peer payments, electronic and crypto-currencies such as Bitcoin, large-scale B2B payments and the future of money.

Prerequisite: FITE1010 or MATH1853 or MATH2101; and COMP2119 or ELEC2543 or FITE2000
Assessment: 40% continuous assessment, 60% examination
LLAW3150. Introduction to information technology law (6 credits)

This is a basic course in the LLM IP/IT stream introducing students to the information technology and the legal issues arising from the technology. The course will begin by examining the essential features of information technology and the characteristics of the Internet, followed by investigations into the legal issues created by the technology. Discussions will primarily be based on the laws of Hong Kong, with references made to the laws of other leading jurisdictions. Topics to be covered include, but are not not limited to, the following:

- Introduction to information technology and the Internet
- Intellectual property issues
- Illegal contents on the Internet (e.g. defamatory or obscene materials)
- Online trading
- Data privacy
- E-crimes
- Jurisdictional issues

Assessment: 100% research paper

LLAW3244. Alternative Finance (6 credits)

The course will critically evaluate the claim that FinTech—a portmanteau of finance and technology, including blockchain, artificial intelligence, robo adviser solution, big data and automated suspicious transaction monitoring technology systems—has the ability to revolutionise financial inclusion and examines whether RegTech can be used by regulators for tracking and monitoring financial institutions’ compliance activities.

RegTech is a new form of FinTech since both are rooted in post-2008 global financial crisis regulatory requirements, although RegTech’s development was preceded by that of FinTech. Notably, the causes underlying FinTech’s and RegTech’s respective developments vary. RegTech is deployed to meet the regulatory challenges created by FinTech. Specifically, RegTech aims to more effectively regulate new commercial transactions facilitated by FinTech, such as payments made through mobile devices and equity crowdfunding through the internet portals which are cornerstones of the proposed course on alternative finance (i.e. internet financing).

Hong Kong is a leading international financial centre; its reputation and strategic role necessitates its work with international community by connecting to the global FinTech industries in the US, the UK, Singapore and China and their regulators in order to create an alternative opportunity to devise smarter financial regulations and better resolution within the FinTech sector.

The course will begin by expounding the role of FinTech in both the shadow banking and the traditional banking systems, followed by an exploration of the types of FinTech-enabled products and payment services such as crowdfunding and P2P lending, and ending with a forward-looking approach in tackling some critical and timely issues related to FinTech, including, but not limited to, financial democratisation, improving access to financial system, sharing economy and privacy protection for consumers.

Assessment: 80% Take home final exam, 20% Group research project
LLAW3254. Law, Innovation, Technology and Entrepreneurship (LITE)

This course focuses on the legal environment impacting entrepreneurs, startups and new innovative businesses and ideas. It addresses the core aspects of setting up a new business, including legal structures, hiring staff, protecting intellectual property, raising finance, licensing considerations, data protection and usage, and cross-border operations. It is designed for upper year students in any discipline who are considering a new venture or already involved in a startup or innovative project.

Assessment: 80% short assignments, 20% class participation

LLAW3255. Law, Innovation, Technology and Entrepreneurship (LITE) Internship

This is an experiential learning course in which students will be placed with startups and innovation labs in order to gain an understanding of the environment in which such firms operate. It will include a taught as well as an assessed component.

Assessment: 100% internship report

ENGL1015. Introduction to English linguistics (6 credits)

This survey course offers a comprehensive first introduction to the linguistic study of English, covering the various levels of analysis (and the core branches of linguistics that study them): sounds (phonetics and phonology), words (morphology and lexicology), meanings (semantics and pragmatics), grammar (syntax), text and discourse (discourse analysis). It will also offer a first introduction to a number of key aspects of language use (and the linguistic disciplines dealing with them): language acquisition and processing (psycholinguistics), language change (historical linguistics), regional and social variation (sociolinguistics), [literary] style (stylistics). Finally, the course will introduce a number of methodological and theoretical approaches one can take in the academic study of a language, and consequently also in English language research.

Assessment: 100% coursework.

ENGL2050. English corpus linguistics (6 credits)

Corpus linguistics is a rapidly-developing methodology in the study of language. It exploits the power of modern computer technology to manipulate and analyse large collections of naturally occurring language (‘corpora’). This course will introduce students to the use of computers and computerized corpora as tools for exploring the English language.

Assessment: 100% coursework.
PSYC1004.  **Introduction to quantitative methods in psychology (6 credits)**

This course adopts a practical approach to teaching the analytical aspects of research techniques in psychology. It is designed to provide students with the basic background in research design and data analysis. The logic of statistical inference and scientific explanation, the merits and limitations of quantitative approaches to the study of psychological phenomena, and research ethics will all be discussed. Priority will be given to students planning to major in psychology.

Assessment: 100% coursework.

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PSYC2007.  **Cognitive psychology (6 credits)**

This course covers how humans learn to deal with information from the environment. Topics include various aspects of perception, memory, concept structure and learning, and thinking. Students will be involved in conducting experiments on cognitive functioning as part of the coursework.

Prerequisites: PSYC1001 and PSYC1004.
Assessment: 100% coursework.

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**Capstone Experience**

FITE4801.  **Project (12 credits)**

Student individuals or groups, during the final year of their studies, undertake full end-to-end development of a substantial project, taking it from initial concept through to final delivery. The project will be the application of technology to finance discipline.

Assessment: 100% continuous assessment