Department of Finance

Program of Financial Engineering

2017

I. Introduction

The rapid development of financial technology has changed the existing financial ecosystem. It is affecting, in every way, the payment method, financial innovation, market operation, service providing, and regulation rules. As a cross-sectional discipline, financial technology is innovating global financial industry. By combining the information science and data science, this new discipline is implementing cutting edge achievements of those areas and will make a big difference in improving the efficiency of the finance market. With this background, SUSTC creatively launches the major of Financial Technology to fit this big environment.

The graduates from this major will have excellent quantitative and technical skills to meet the requirements of the diversified roles in the financial industry, such as in the field of investment banks, commercial banks, asset management, government regulation, Internet finance, and etc. Graduates will also be prepared to continue with a further study in the area of, but not limited to, finance, business analysis, computer science and information engineering.

Following SUSTC's philosophy, "innovative, high-end, cutting-edge, international", this major will fit to the reality of China's finance reform and development. At the same time, the major will also meet to the needs of the latest research dynamic, nation's development strategy, and the development of Perl River Delta and Shenzhen City. With the strong supports from our excellent faculties, facilities, and research achievements, the major's main teaching and research interests will focus on electronic currency technology, finance information science, internet finance, intelligent investment, financial big data and etc. These achievements will make a contribution to China's finance reform and development, as well as to financial

innovation in Perl River Delta and Shenzhen City.

II. Objectives

The target of the major is to provide the excellent education to financial technology talents. With well-designed text books and curriculums, the major will efficiently help the students develop core skills to apply to the real problems with the professional knowledge that they have learned in the classes. The students in the major will: meet the needs of socialist market economic construction; comprehensively develop in moral, intellectual, physical and aesthetic aspects; adapt to the open economic environment, and build solid foundations in economics, finance, computer technology and English; master the basic theory and method of financial technology; have a good ideological, business, cultural and psychological quality; have a strong practical, innovation and application ability; be able to work in the frontier areas of innovation such as digital currency, electronic payment, intelligent investment, financial big data and etc.

III. Period of Study and Degree Requirement

Time length： 4 years

Degree conferred: Bachelor of Economics

The minimum credit requirement for graduation:129credits（Not include English）

IV. Discipline

Economics

V. Main Courses

Major Foundational Courses: Microeconomics, Macroeconomics, Financial Accounting, Corporate Finance, Probability and Statistics, Discrete mathematics, Data structures and algorithm analysis, Computer system design.

Major Core Courses: Cases in FinTech (I&II), Financial Data Analysis and Data Mining, Financial Investments, Econometrics, Financial Risk Management, Artificial intelligence, Computer networks.

VI. Practice-Based Courses

The practice teaching part mainly includes: Internship Program (summer semester in Year 3), Practice of Financial Theory (From the third, each students in FinTech will be equipped with an academic mentor and an industry mentor.), and all kinds of undergraduate academic competitions at home and abroad.

Main Practice-Based Courses: Data structures and algorithm analysis, Computer system design, Financial data analysis and data mining, Artificial intelligence, Computer networks, Computer organization principle, Database management systems and financial applications, Quantitative investment analysis, Big data technology, Parallel and cloud computing, Financial modeling and analysis, China economics and finance, Machine learning, Data-based trading simulation.

VII. Course Structure and Credit Requirements

General Education (GE）Required Courses : 48.5 credits（Not include English）

General Education (GE) Elective Courses: 10 credits

Major Foundational Courses: 24 credits

Major Core Courses: 21 credits

Major Elective Courses: 15.5 credits

Undergraduate Thesis/Projects: 8 credits;

Research Projects(Practice of Financial Theory)： 2 credits;

The minimum credit requirement for graduation: 129 credits（Not include English）.

VIII. Requirement for GE Required Courses

Course Code	Course Name	Credits
MA101B	Calculus I A	4
MA102B	Calculus II A	4
MA103A	Linear Algebra I A	4
PHY103C	General Physics I C	3
PHY105C	General Physics II C	3

CH101B	General Chemistry B	3
BIO102B	General Biology B	3
CS102A	Introduction to Programming A	3
NOTE: English must meet the requirements prescribed by the school.		

IX. Pre-requisites for Major Declaration

Course Code	Course Name	Notes
MA101B	Calculus I A	
MA102B	Calculus II A	
MA103A	Linear Algebra I A	
CS102A	Introduction to Programming A	
MA212	Probability and Statistics	
FIN201	Microeconomics	
FIN204	Macroeconomics	
Note: At least, the above courses should be pass for the grades.		

X. Course Arrangement

Table 1: Major Required Course (Foundational and Core Courses)

Course Category	Course code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite*	Dept.
Major Foundational Courses	FIN201	Microeconomics	3		3	Fall	1/Fall	C/E		FIN
	FIN204	Macroeconomics	3		3	Spr.	1/Spr.	C/E		
	FIN203	Financial Accounting	3		3	Fall	1/Fall	C/E		
	FIN206	Corporate Finance	3		3	Spr.	2/Spr.	C/E	Financial Accounting	
	MA205	Discrete mathematics	3		3	Spr.	2/Spr.	C	Mathematical Analysis III or Real Analysis	MATH
	MA212	Probability and statistics	3		3	Spr.	2/ Fall ,Spr.		Calculus II A	
	CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	C/E	Introduction to Programming A	CS
	CS209A	Computer System Design and Application A	3	1	4	Fall	2/Fall	C/E	Introduction to Programming A	
	Total		24	2	26					
Major Core Course	FET202	Cases in FinTech I	1.5		1.5	Spr.	2/Spr.	C		FIN
	FET301	Cases in FinTech II	1.5		1.5	Fall	3/Fall	C		
	FIN208	Financial Data Analysis and Data Mining	3	1	4	Spr.	3/Spr.	C/E	Probability and Statistics	
	FIN301	Financial Investments	3		3	Fall	2/Fall	C/E	Microeconomics , Macroeconomics, Probability and Statistics	
	FIN303	Econometrics	3		3	Fall	3/Fall	C/E	Microeconomics , Macroeconomics, Probability and Statistics	
	FET303	Financial Risk Management	3		3	Spr.	3/Spr.	C/E	Corporate Finance , Probability and Statistics	
	FIN311	Artificial Intelligence and Its Applications in Finance	3		3	Fall	3/Fall	B	Introduction to Programming A	
	FIN307	Database Management Systems and Financial Applications	3	1	4	Fall	3/Fall	B	Introduction to Programming A	
	Total		21	3	24					

FET470	Practice of Financial Theory	2	2	4					
FET490	Undergraduate Thesis	8	8	16					
Total		55	15	70					

*Note: Prerequisite includes the requisite of the prerequisite. Course and its Prerequisite can be study at the same time, but the prerequisite cannot later than the course.

** Note: Practice of Financial Theory replaces Research Projects in other programs. Every junior in Financial Engineering program will be assigned with an industry mentor, who will instruct a typical problem in a practical. Inspired by this problem, students should finish their thesis or internship under the guidance of their academic mentor and industry mentor.

*** Note: The credits CS201 Discrete Mathematics can replace the credits of MA205 Discrete Mathematics; The credits MA211 Data structure and algorithms can replace the credits of CS203B Data Structures and Algorithm Analysis B; The credits FIN301 Econometrics can replace the credits of FIN303 Econometrics.

Table 2: Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite*	Dept.
FIN207	Financial Markets and Institutions	3		3	Fall	2/Fall	C/E		FIN
FET204	Commercial Bank	3		3	Spr.	2/Spr.	C/E		
CS202	Computer Organization Principle	3	1	4	Spr.	2/Spr.	C/E	Digital logic	CS
CS305B	Computer networks B	3	1	4	Fall	3/Fall	B	Introduction to Programming A	
FIN305	Options, Futures and Financial Derivatives	3		3	Fall	3/Fall	C/E	Corporate Finance, Financial Investments	FIN
FIN411	International Finance	2		2	Fall	3/Fall	C/E		
FET305	Artificial Intelligence and Game Theory	3		3	Fall	3/Fall	C/E		
FET302	Financial Information System	3		3	Spr.	3/Spr.	C/E		
FET304	Algorithmic Investing and AI Advisor	2		2	Spr.	3/Spr.	C/E		

FIN308	Financial Economics	3		3	Spr.	3/Spr.	C/E	Corporate Finance	
FIN304	Financial Time Series**	3		3	Spr.	3/Spr.	C/E	Econometrics	
FIN306	Fixed Income: Models and Applications	2		2	Spr.	3/Spr.	C/E	Options, Futures and Financial Derivatives	
FIN407	Investment Banking	3		3	Fall	3/Spr.	C/E	Corporate Finance	
FIN413	Quantitative Investment Analysis	3		3	Spr.	3/Spr.	C/E	Econometrics, Financial Investments	
FET306	Business Analytics with Big Data	3	1	4	Spr.	3/Spr.	B	Financial Data Analysis and Data Mining	FIN
CS316	Parallel and Cloud Computing NOTE	3	1	4	Spr.	3/Spr.	C/E		CS
CS403	Cryptography and Network Security NOTE	2		2	Spr.	3/Spr.	C/E	CS201,CS203B,MA212	
MA304	Multivariate Statistical Analysis	3		3	Spr.	3/Spr.	C/E	Probability and Statistics or Statistics	MATH
FIN409	Financial Modeling and Analysis	3		3	Fall	4/Fall	C/E	Probability and Statistics	FIN
FIN310	China Economics and Finance	3		3	Spr.	3/Spr.	C/E	Microeconomics, Macroeconomics Corporate Finance Financial Investments	
FET307	Social Network Analysis and Financial Applicatiions	3		3	Fall	3/Fall	B	MA212	FIN
FETS20	Internet Finance	1		1	Smr.	2/Smr.	C/E		

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FETS202	Data-Based Trading Simulation	1	1	2	Smr.	2/ Smr.	C/E		
FETS302	Digital Currencies, Blockchains, and the Fintech Services Industry	1		1	Smr.	3/ Smr.	C/E		
FINS101	Fintech and Financial Marketing	1		1	Smr.	2/ Smr.	B		
FETS203	Blockchain Technology: Development and Applications	1		1	Smr.	3/ Smr.	B	FIN201 FIN203 FIN206 FIN204	
FETS301	Internship***	3	3	6	Smr.	3/ Smr.	C/E		
Total		65	11	76					

Note: Courses above should be study at least 15.5 credits for every student.
*Note: Prerequisite includes the requisite of the prerequisite. Course and its Prerequisite can be study at the same time, but the prerequisite cannot be learned later than the course.
**Note: The credits of MA309 Time series analysis can replace the credits of FIN304 Financial Time Series partly.
***Note: Students should carry out the Internship in the summer term after the third year. The three credits requirements ask for 96 hours in total.

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite*	Dept.
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	C/E		CS
CS209A	Computer System Design and Application A	3	1	4	Fall	2/Fall	C/E		
FIN208	Financial Data Analysis and Data Mining	3	1	4	Spr.	3/Spr.	C/E		FIN
CS303B	Artificial Intelligence B	3	1	4	Fall	3/Fall	C/E	Basis for computer programming, Data structures and algorithm analysis	CS
CS305B	Computer Networks B	3	1	4	Fall	3/Fall	C/E	Basis for computer programming	
CS202	Computer Organization Principle	3	1	4	Spr.	2/Spr.	C/E	Digital logic	
FIN307	Database Management Systems and Financial Applications	3	1	4	Fall	3/Fall	C/E	Computer System Design	FIN
CS314	Big Data Technology	3	1	4	Spr.	3/Spr.	C/E		CS
CS316	Parallel and Cloud Computing	3	1	4	Spr.	3/Spr.	C/E		
CS405	Machine Learning	3	1	4	Fall	4/Fall	C/E	Probability and	CS

								Statistics, Linear algebra(I)	
FETS202	Data-Based Trading Simulation	1	1	2	Smr.	2/ Smr.	C/E		Fin
FETS301	Internship	3	3	6	Smr.	3/ Smr.	C/E		
FET470	Practice of Financial Theory	2	2	4					
FET490	Thesis	8	8	16					
Total		47	25	72					

Table 4: Overview of Course Hours and Credits

Course Category	Total Course Hours (Not include English)	Total Credits (Not include English)	The Minimum Credit Requirement (Not include English)
General Education (GE) Required Courses	880	50.5	48.5
General Education (GE) Elective Courses		10	10
Major Foundational Courses	416	24	24
Major Core Courses	384	21	21
Major Elective Courses	1216	15.5	15.5
Research Projects, Internship and Undergraduate Thesis/Projects	320	10	10
Total		131	129