Program of Financial Engineering for International Students (2019)

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 and Learning Outcomes

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.

1. Have a basic understanding of classic theory, growth theory and business cycles theory, should be able to employ qualitative and quantitative methods to analyze and explain to others how various behaviors of economic agents and government policies can be explained by economics. Understand the challenges, practical significance and future impact of financial technology on the traditional financial industry. Understand the major areas of financial technology, the developments in various fields and their application scenarios. Understand the possibilities and opportunities that financial technology provides for the future development of the financial industry. Implement the key

technologies of existing financial technology from the perspective of different financial industry.

2. Students will be able to explain basic Corporate Finance concepts, such as time value of money and risk-return trade-off, evaluate firms' capital budgeting projects, dividend policy and capital structure, Read and analysis financial statements. Evaluate financial statements of a listed company. Students should master basic data structures and algorithms. In addition, they should be also to choose reasonable data structures according to practical demand of algorithms. Students should master basic data structures and algorithms. In addition, they should be also to choose reasonable data structures according to practical demand of algorithms.

3. Students should master basic theories and technologies of artificial intelligence. In addition, they should be also to apply such theories and technologies to develop simple financial intelligent systems. Describe the target and requirements for a spectrum of business data analysis and data mining problems in finance, marketing, etc. Develop the ability to employ data mining algorithms to discover patterns in data to address the selected problems. Creatively apply and adapt the introduced modeling techniques to propose original findings for practical organizational data analysis problems. Creatively communicate analytic procedure and results effectively in presentations with oral, written and electronic formats.

III. Study Length and Graduation Requirements

Study length: 4 years

Degree conferred: Bachelor of Economics

The minimum credit requirement for graduation: 133 credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (47 creidts(	Science	27
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses (16 creidts)	Humanities	4
	Social Sciences	4
	Arts	2
	Science	6
Major Course (70 creidts)	Major Foundational Courses	30
	Major Core Courses	18
	Major Elective Courses	9
	Research Projects, Internship and Undergraduate Thesis / Projects	13
Total (not including English courses)		133

IV. Discipline

Financial Engineering

V. Main Courses

Major Foundational Courses: Probability and Statistics, Microeconomics, Macroeconomics, Financial Accounting, Corporate Finance

Major Core Courses: Special Topics in Finance and Entrepreneurship, Financial Data Analysis and Data Mining, Financial Investments, Econometrics, Options, Futures and Other Financial Derivatives,

Empirical Methods in Finance

VI. Practice-Based Courses

Internship Programs

Our internship program provides students with professional and real-life business experience during their university years. We encourage students to get first-hand knowledge of how corporations operate on a day-to-day basis by recognizing their hard-work with credits towards graduation and by providing internship subsidies to cover their daily expenses. On top of this, we have established some connections with the business community for internship opportunities with corporations such as the Bank of China.

VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of First Year	MA101B	Calculus I A	
	MA102B	Calculus II A	MA101B
	MA107A	Linear Algebra A	
	CS102A	Introduction to Computer Programming A	
	FET203	FinTech Mathematics	MA107A
	FIN201	Microeconomics	
Declare major at the end of Second Year	MA101B	Calculus I A	
	MA102B	Calculus II A	MA101B
	MA107A	Linear Algebra A	
	CS102A	Introduction to Computer Programming A	
	MA212	Probability and Statistics	MA102B
	FET203	FinTech Mathematics	MA107A
	FET206	Data Structures and Financial Applications	CS209A

VIII. Requirements for GE Required Courses

(I) Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
MA101B	Calculus I A	4		4	1/Fall	E		MATH
MA102B	Calculus II A	4		4	1/Spr	E	MA101B	MATH
MA107A	Linear Algebra A	4		4	1/Fall	E		MATH
PHY103C	General Physics C (I)	3		3	1/Fall	E		PHY
PHY105C	General Physics C (II)	3		3	1/Spr	E	PHY103C	PHY
CH101B	General Chemistry B	3		3	1/Spr	E		CHE
BIO102B	Introduction to Life Science	3		3	1/Spr	E		BIO
CS102A	Introduction to Computer Programming A	3	1	4	1/Fall	E		CSE
	Total	27	1	28				

(I) Physical Education

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
GE131	Physical Education I	1		2	1/Fall	C	NA	PE Center
GE132	Physical Education II	1		2	1/Spr	C	NA	PE Center
GE231	Physical Education III	1		2	2/Fall	C	NA	PE Center
GE232	Physical Education IV	1		2	2/Spr	C	NA	PE Center
	Total	4		8				

(III) Chinese Languages & Culture

Course Code	Course Name	Credit	Hours/week	Term	Language Instruction	Prerequisite	Dept
CLE008	Elementary Chinese I	2	4	1/Fall	B	NA	CLE
CLE009	Elementary Chinese II	2	4	1/Spr	B	CLE008	CLE
CLE027	Intermediate Chinese I	2	4	2/Fall	B	CLE009	CLE
CLE028	Intermediate Chinese II	2	4	2/Spr	B	CLE027	CLE
CLE031	Advanced Chinese I	2	4	3/Fall	B	CLE028	CLE
CLE032	Advanced Chinese II	2	4	3/Spr	B	CLE031	CLE
CLE033	Chinese Culture	2	2	Spr/Fall	B/E	NA	CLE/HUM/SSC
CLE034	Chinese History	2	2	Spr/Fall	B/E	NA	CLE/HUM/SSC
	Total	16	28				

(IV) English Language

All students are required to undertake the English Placement Test before selecting courses, based on which students will be assigned to 3 levels to be ready for the courses with English as the instruction language.

SUSTech English III, English for Academic Purposes are required for Level A.

SUTech English II, SUSTech English III, English for Academic Purposes for Level B.

SUSTech English I, SUSTech English II, SUSTech English III, English for Academic for Level C.

Course Code	Course Name	Credit	Hours/week	Instruction Language	Prerequisite	Dept
CLE021	SUSTech English I	4	4	E	NA	CLE
CLE022	SUSTech English II	4	4	E	CLE021	
CLE023	SUSTech English III	4	4	E	CLE022	
CLE030	English for Academic Purposes	2	2	E	CLE023	

IX. Requirements for GE Elective Courses

(I).Students are required to complete 4 credits for the Humanities Module and Social Sciences Module respectively, and 2 credits for the Music and Art Module. (Information about the available courses and the instruction language will be announced before the course selection session)

(II).Students are required to complete 6 credits for Science Module.

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
EE205	Signals and Systems	3	1	4	2/Fall	B	MA101B	EE
MA333	Introduction to Big Data Science	3		3	3/Fall	B	MA212	MATH
GE351	Scientific Literature and Writing	1		1	3/Fall	B		CHEM
CS101A	Introduction to Computer A	2		2	1/Fall	B		CSE
CS207	Digital Logic	3	1	4	2/Fall	B		CSE
CS205	C/C++ Programming Design	3	1	4	2/Spr	B		CSE
PHY104B	Experiments of Fundamental Physics	2	2	4	1/Spr	B		PHY
	Total	17	5	22				

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

Course Category	Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
Major Foundational Courses	FIN201	Microeconomics	3		3	Fall	1/Fall	B		FIN
	FIN215	Political Economics	3		3	Fall	2/ Fall	C		FIN
	FIN203	Financial Accounting	3		3	Fall	1/Fall	B		FIN
	MA212	Probability and Statistics	3		3	Fall/ Spr	2/ Fall/Spr		MA102A	MATH
	FIN204	Macroeconomics	3		3	Spr	1/Spr	B		FIN
	CS209A	Computer system design and applications A	3	1	4	Fall	2/Fall	B	CS102A	CSE
	FET203	FinTech Mathematics	3		3	Spr	1/Spr	B	MA107A	FIN
	FIN206	Corporate Finance	3		3	Spr	2/Spr	B	FIN203	FIN
	FET206	Data Structures and Financial Applications	3		3	Spr	2/Spr	B	CS209A	FIN
	FIN303	Econometrics	3		3	Fall	3/Fall	B	FIN201 FIN204 MA212	FIN
	合计		30	1	31					
Major Core Courses	FET202	Cases in FinTech I	1.5		15	Fall	2/Fall	C		FIN
	FET301	Cases in FinTech II	1.5		15	Spr	2/Spr	C		FIN
	FIN301	Financial Investments	3		3	Fall	3/Fall	B	FIN201 FIN204 MA212	FIN
	FIN311	Artificial Intelligence and Its Applications in Finance	3		3	Fall	3/Fall	B	CS209A	FIN
	FIN307	Database Management Systems and Financial Applications	3	1	4	Fall	3/Fall	B	CS209A	FIN
	FIN208	Financial data analysis and Data Mining	3	1	4	Spr	3/Spr	B	MA212	FIN
	FET303	Financial Risk Management	3		3	Spr	3/Spr	B	FIN206 MA212	FIN
	Total		18	2	20					
Practice-Based Courses	FETS301	Internship	3	3	6	Smr	3/Smr	B		FIN
	FET470	Practice of Financial Theory	2	2	4	Fall/ Spr	ANY	B		FIN
	FET490	Thesis	8	8	16	Spr	4/ Spr	B		FIN
	合计		13	13	26					

Table 2: Major Elective Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
FIN102	Finance	3		3	Fall	1/Fall	B		FIN
FET102	Principles of FinTech	3		3	Fall	1/Fall	B		FIN
FIN213	Financial Markets and Institutions	3		3	Fall	2/Fall	B		FIN
FIN209	Entrepreneurial Finance and Innovation I	3		3	Fall	2/Fall	B		FIN
FET204	Commercial Bank	3		3	Fall	2/Fall	B		FIN
FIN212	Financial Statement Analysis	3		3	Spr	2/Spr	E	FIN203 FIN206 FIN201 FIN204	FIN
CS202	Computer organization principle	3	1	4	Spr	2/Spr	B	CS207	CSE
FETS101	Technical Innovation and Financial Innovation	1		1	Smr	2/Smr	C	FIN206	FIN
FIN401	Computational Finance	3		3	Fall	3/Fall	B		FIN
CS305B	Computer networks B	3	1	4	Fall	3/Fall	B	CS102A	CSE
FIN411	International Finance	2		2	Fall	3/Fall	B	FIN206 FIN301	FIN
FIN304	Financial Time Series	3		3	Fall	3/Fall	B	FIN201 FIN204 MA212	FIN
FETS203	Blockchain Technology: Development and Applications	1		1	Smr.	3/ Smr.	B	FIN201 FIN203 FIN206 FIN204	FIN
FET306	Business Analytics with Big Data	3	1	4	Spr	3/Spr	B		FIN
FIN302	Empirical Methods in Finance	3		3	Spr	3/Spr	B	FIN301 FIN303	FIN
FIN305	Options, Futures and Financial Derivatives	3		3	Spr	3/Spr	B	FIN206 FIN301	FIN
FIN308	Financial Economics	3		3	Spr	3/Spr	B	MA212 FIN206	FIN
FIN306	Fixed Income: Models and Applications	2		2	Spr	3/Spr	B	FIN305	FIN
FIN407	Investment Banking	3		3	Spr	3/Spr	B	FIN206	FIN
FIN413	Quantitative Investment Analysis	3		3	Spr	3/Spr	B	FIN303 FIN301	FIN
CS316	Parallel and Cloud Computing	3	1	4	Spr	3/Spr	B		CSE
CS403	Cryptography and Network Security	2		2	Spr	3/Spr	B	CS201 CS203 MA212	CSE

MA304	Multivariate Statistical Analysis	3		3	Spr	3/Spr	B	MA212 或 MA204	MATH
FIN310	China Economics and Finance	3		3	Spr	3/Spr	B	FIN201 FIN204 FIN206 FIN301	FIN
FIN409	Financial Modeling and Analysis	3		3	Fall	4/Fall	B	MA212	FIN
Total		68	4	72					

Notes:
1. Students are required to complete 9 credits for the Major Elective Courses.

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
CS209A	Computer system design and applications A	3	1	4	Fall	2/Fall	B	CS102A	CSE
CS207	Digital Logic	3	1	4	Fall	2/Fall	B		
CS307	Database Principle	3	1	4	Spr	2/Spr	B		
CS205	C/C++ Programming Design	3	1	4	Fall/ Spr	2Fall	B		
CS202	Computer organization principle	3	1	4	Spr	2/Spr	B	CS207	
CS305B	Computer networks B	3	1	4	Fall	3/Fall	B	CS102A	
CS316	Parallel and Cloud Computing	3	1	4	Spr	3/Spr	B		
PHY104 B	Experiments of Fundamental Physics	2	2	4	SprF all	1	B		PHY
FIN307	Database Management Systems and Financial Applications	3	1	4	Fall	3/Fall	B	CS209A	FIN
FIN208	Financial data analysis and Data Mining	3	1	4	Spr	3/Spr	B	MA212	
FET306	Business Analytics with Big Data	3	1	4	Spr	3/Spr	B		
FETS301	Internship	3	3	6	Smr	3/Smr	B		
FET470	Practice of Financial Theory	2	2	4			B		
FET490	Thesis	8	8	16			B		
Total		45	25	70					

Table 4: Overview of Course Hours and Credits

Course Category	Total Course Hours	Total Credits	Credit Requirements	Percentage of the Total*
General Education (GE) Required Courses (not including English courses)	944	47	47	35%
General Education (GE) Elective Courses			16	12%
Major Foundational Courses	384	30	30	21%
Major Core Courses	288	18	18	14%
Major Elective Courses	1120	68	9	9%
Research Projects, Internship and Undergraduate Thesis/Projects	122	13	13	10%
Total (not including English courses)	2736	170	133	

* Percentage of the total= Credit requirements of each line / Total credit requirements

Curriculum Structure of Financial Engineering

Freshman	Sophomore	Junior	Senior
General education	General education	General education	General education
Microeconomics	Computer system design and application A	Econometrics	Computer networks B
Macroeconomics	Cases in FinTech I II	Financial Investments	Parallel and Cloud Computing
FinTech Mathematics	Data Structures and Financial Applications	Artificial Intelligence and Its Applications in Finance	Practice of Financial Theory
Principles of FinTech	Financial Markets and Institutions	Database Management Systems and Financial Applications	Thesis
Financial accounting	Entrepreneurial Finance and Innovation I	Financial data analysis and Data Mining	
Corporate finance	Financial marketing	Financial Risk Management	
		Intern	

PS： These are suggested semesters, which students can adjust according to their own academic planning.