College of Business

Program of Financial Engineering for International Students (2024)

I. Introduction

Academic subject areas: 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.

Program code: 020302

II. Objectives and Learning Outcomes

1. 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.

2. Learning Outcomes

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, Degree, and Graduation Requirements

1. Study length: 4 years.

2. Degree conferred: Students who complete and meet the degree requirements of the undergraduate program will be awarded a bachelor's degree in Economics.

3. The minimum credit requirement for graduation: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
General Education Courses	Chinese Language and Culture Module	Chinese Language and Culture	16
	Arts and Physical Education Module	Physical Education	4
		Arts	2
	Competence Development Module	Computer Programming	3
		Writing	2
		Foreign Languages	14
	Humanities and Social Sciences Module	Humanities	6
		Social Sciences	
		Chinese Studies	2
	Mathematics and Natural Sciences Module	Mathematics	12
		Physics	10
		Chemistry	3
		Geoscience + Life Science	3
	GE to Majors Bridging Module	Introduction to Majors	2
Major Courses	Major Required Courses	Major Foundational Courses	27
		Major Core Courses	21
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	17
	Major Elective Courses	Major Elective Courses	8
Total			152
Note: please see the General Education Requirement for more details on Chinese Language and Culture Module, Arts and Physical Education Module, Competence Development Module（Foreign Languages & Writing）, Humanities and Social Sciences Module, and GE to Majors Bridging Module.			

IV. Course Requirements for the Mathematics and Natural Sciences Module and Computer Programming

Course Category	Course Code	Course Name	Credits	Terms	Prerequisite	Dept.
Mathematics	MA117	Calculus I	4	1 Fall		Department of Mathematics
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall		
Physics	PHY105	College Physics I	4	1 Fall		Department of Physics
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall		
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall		Department of Chemistry
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall		Department of Biology
Computer Programming	CS112	Introduction to Python Programming	3	1-2 Spring & Fall		Dept. of Computer Science and Engineering

Note:
1. Mathematics: MA101a Mathematical Analysis I and MA102a Mathematical Analysis II can replace MA117 Calculus I and MA127 Calculus II; MA107 Advanced Linear Algebra I can replace MA113 Linear Algebra.
2. Physics: PHY101 General Physics I and PHY102 General Physics II can replace PHY105 College Physics I and PHY106 College Physics II.
3. Chemistry: CH103 General Chemistry can replace CH105 Chemistry: The Central Science.
4. Geoscience + Life science: BIO103 Principles of Biology / EOE 100 Introduction to Earth Sciences can replace BIO102B Introduction to Life Science
5. Computer Programming: CS109 Introduction to Computer Programming / CS110 Introduction to Java Programming / CS111 Introduction to C Programming / CS113 Introduction to Matlab Programming can replace CS112 Introduction to Python Programming.

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117/ MA101a	Calculus I/Mathematical Analysis I	
	MA127/ MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	MA113/ MA107	Linear Algebra/Advanced Linear Algebra I	
	Note: The students who had completed above two prerequisites can take the rest of prerequisites after declaring the major		
Declare major at the end of the second academic year	MA117/ MA101a	Calculus I/Mathematical Analysis I	
	MA127/ MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	MA113/ MA107	Linear Algebra/Advanced Linear Algebra I	
	CS109/CS110/ CS111/CS112/ CS113	Introduction to Computer Programming / Introduction to Java Programming / Introduction to C Programming / Introduction to Python Programming/ Introduction to Matlab Programming	

Note:
1. If the number of students entering a major at the end of the first academic year in the department is greater than or equal to the total number of the teaching-research faculty (PI)*2*60%, all majors in the department may implement the prerequisites for major declaration at the end of the second academic year.
2. If the number of students entering a major at the end of the first academic year in the department is less than the total number of the teaching-research faculty (PI)*2*60%, all majors in the department do not implement the prerequisites for major declaration at the end of the second academic year.
3. Suppose the number of students applying for a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), then the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).
4. For departments that do not implement prerequisites for major declaration at end of the second academic year, if the cumulative number of students applying for a major at the end of the second academic year and the number of students who have entered a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Financial Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	FIN201	Microeconomics	3	0	1-2 Fall & Spring		Dept. of Finance
	FIN204	Macroeconomics	3	0	1-2 Fall & Spring		
	MA212	Probability and Statistics	3	0	2 Fall & Spring	Calculus II	Dept. of Mathematics
	FIN203	Financial Accounting	3	0	2 Fall		Dept. of Finance, Dept. of ISME
	FIN215	Political Economics	3	0	2 Fall		
	MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Python Programming	
	MIS204	Prescriptive Decision Analytics	3	1	2 Spring		
	FIN303	Econometrics	3	0	3 Fall	Microeconomics, Macroeconomics ,Probability and Statistics	
	EBA301	Data analysis and Data Mining	3	1	3 Fall	Data Management and Databases	
	Total		**27**	**3**			
	FIN206	Corporate Finance	3	0	2 Fall		
	FET206	Data Structures and Financial Applications	3	0	2 Spring	Introduction to Python Programming	
	FIN301	Financial Investments	3	0	3 Fall	Microeconomics/ Macroeconomics /Economics, Probability and Statistics	
	FIN311	Artificial Intelligence and Its Applications in Finance	3	0	3 Fall	Introduction to Python Programming	
	FIN409	Financial Modeling and Analysis	3	0	3 Fall	Probability and Statistics	
	FET303	Financial Risk Management	3	0	3 Spring	Corporate Finance,Probability and Statistics	
	FIN305	Options, Futures and Financial Derivatives	3	0	3 Spring	Corporate Finance,Financial Investments	
	Total		**21**	**0**			
	FETS301	Internship	3	3	3 Summer		Dept. of

	FET470	Practice of Financial Theory	2	2	ANY		Finance
	FIN491	Thesis	12	12	4 Spring		
	Total		17	17			
Total			65	20			

Note：MIS206 Business Data Structures and Algorithms/ MA211 Data structure and Algorithms / CS203B Data Structures and Algorithm Analysis B /CS203 Data Structures and Algorithm Analysis can replace FET206 Data Structures and Financial Applications;
FMA301 Econometrics can replace FIN 303 Econometrics;
FMA304 Asset Pricing and Risk Management can replace FET 303 Financial Risk Management;
CS303B Artificial Intelligence B can replace FIN311 Artificial Intelligence and Its Applications in Finance
CS307 Principles of Database Systems can replace MIS205 Data Management and Databases

Table 2: Major Elective Courses

Program of Financial Engineering

	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Elective Courses in Finance	FET102	Principles of FinTech	3	0	2 Fall		
	MA201b	Ordinary Differential Equations B	4	0	2 Fall	Calculus II	Dept. of Mathematics
	FIN213	Financial Markets and Institutions	3	0	2 Fall		Dept. of Finance
	FIN209	Entrepreneurial Finance and Innovation I	3	0	2 Fall		
	FET219	Life Contingencies Practicum	1	1	2 Fall		
	FIN217	Investment and Risk Management	1	1	2 Fall		
	FET202	Cases in FinTech I	1.5	0	2 Fall		
	FIN218	Managerial Accounting	3	0	2 Fall	Financial Accounting	
	FIN205	Special Topics in Finance and Entrepreneurship I	1.5	0	2 Fall		
	FET204	Commercial Bank	3	0	2 Fall		
	FIN210	Economics of Money and Banking	3	0	2 Spring		
	MIS202	Marketing	3	0	2 Spring		
	FIN202	Special Topics in Finance and Entrepreneurship II	1.5	0	2 Spring		
	FET301	Cases in FinTech II	1.5	0	2 Spring		
	FIN214	Securities Investment Practicum	1	1	2 Spring		
	FIN212	Financial Statement Analysis	3	0	2 Spring	Microeconomics ,Macroeconomic	

Code	Course Name			Semester	Prerequisite	Department
					s,Corporate Finance	
MA208	Applied Stochastic Processes	3	0	2 Spring	Probability and Statistics	
FIN411	International Finance	2	0	3 Spring	Corporate Finance,Financial Investments	
FET306	Business Analytics with Big Data	3	1	3 Spring		
FIN417	Corporate Finance Case analysis	3	0	3 Fall	Microeconomics,Macroeconomics,Corporate Finance	
FIN304	Financial Time Series	3	0	3 Fall	Microeconomics,Macroeconomics,Probability and Statistics	
FIN314	Frontier and Practice of Securities Market	1	1	3 Fall	Microeconomics,Macroeconomics	
MA228	Nonlife Actuarial Models	3	0	3 Fall	Probability and Statistics	
MA303	Partial Differential Equations	3	0	3 Fall	Ordinary Differential Equations B	Dept. of Mathematics
FMA303	Security Investments	3	0	3 Fall	Probability and Statistics	
MA322	Life Insurance Actuarial Science	3	0	3 Spring	Probability and Statistics	
FIN312	Actuarial Modelling with Applications in Insurance	3	0	3 Spring	Econometrics,Probability and Statistics	
FIN302	Empirical Methods in Finance	3	0	3 Spring	Financial Investments,Econometrics	
FIN313	Strategic Behavior	3	0	3 Spring		
FIN407	Investment Banking	3	0	3 Spring	Corporate Finance	Dept. of Finance
FIN306	Fixed Income: Models and Applications	2	0	3 Spring	Options, Futures and Financial Derivatives	
FIN310	China Economics and Finance	3	0	3 Spring	Microeconomics,Macroeconomics,Financial Investments	
FIN308	Financial Economics	3	0	3 Spring	Corporate Finance,Probability and Statistics	
MA308	Statistical Computation and Software	3	0	3 Spring	Probability and Statistics	Dept. of Statistics and Data Science
MA304	Multivariate Statistical Analysis	3	0	3 Spring	Probability and Statistics	
FIN403	Cases in Financial Innovations	3	0	4 Fall		Dept. of Finance
FIN413	Quantitative Investment Analysis	3	0	4 Fall	Financial Investments,Econometrics	
	Total	**96**	**5**			
EBA103	Lectures on the	2	0	1 Spring		Dept. of

						MIS
	Frontiers of Big Data Management and Applications					
EBA105	Business Communication and Protocol	2	0	1 Spring		
EBA203	Management Information System	3	1	2 Fall	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	
EBA207	Management System Analysis and Design	3	1	3 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	
EBA420	Management Frontiers and Practices I	3	1	4 Fall		
EBA421	Management Frontiers and Practices II	3	1	4 Spring		
MIS104	Business Model Research	2	0	1 Fall		
MIS208	Behavioral and Experimental Economics	3	1	2 Spring		
MIS212	Business Negotiations	3	1	2 Spring		
MIS223	Social Media and Digital Marketing	3	1	2 Fall		
MIS301	Big Data Analysis and Application	3	1	3 Spring	Probability and Statistics	
MIS302	Big Data Management and ERP	3	1	4 Fall	Management Information System/ Data Management and Databases	
MIS303	Big Data Governance and Business Model	3	1	4 Fall	Management Information System/ Data Management and Databases	
MIS305	Data Intelligence and Decision Analytics	3	1	3 Spring	Probability and Statistics	
MIS308	Empirical Methods in Economics and Management	3	1	4 Fall	Data Statistics and Econometrics	
MIS309	Business History and Economic	3	0	3 Spring		

				Development Model in China and Overseas	
MIS310	Social Network Models and Applications	3	1	4 Fall	
MIS312	Entrepreneurial Thinking and Management	3	0	3 Fall	
MIS316	Fundamentals and Methods of Deep Learning	3	1	3 Spring	Data Mining and Business Applications
MIS407	Data Modeling and Analysis in Production Operations	3	1	3 Spring	
MIS317	Data Statistics and Econometrics	3	1	3 Spring	Probability and Statistics
MIS321	Consumer Behavior	3	0	2 Fall	
MIS322	International Business	3	0	2 Fall	
MIS323	Marketing Research	3	0	2 Spring	
MIS332	Blockchain Essentials and Practices	3	1	3 Fall	
MIS401	Advanced Marketing	3	1	3 Spring	Marketing
MIS403	Big Data and Cluster Project Management	3	0	3 Spring	
MIS404	Operations Management	3	0	3 Fall	Prescriptive Decision Analytics
MIS405	Advanced E-commerce and Management	3	0	4 Spring	
MIS406	Judgment and Decision Making	3	0	4 Fall	
MIS408	Advanced Operations Research	3	0	3 Spring	
MIS411	Digital Marketing Analytics	3	1	4 Fall	
Total		**93**	**19**		

Note: A minimum of 8 credits MUST be taken to fulfill Major Elective Courses
MA201a Ordinary Differential Equations A can replace MA201b Ordinary Differential Equations B;
MA309 Time Series Analysis can replace FIN5017 Financial Time Series;
EBA208 Economics of Money and Finance can replace FIN210 Economics of Money and Bank

Table 3: Overview of Practice-based Learning

Program of Financial Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS112	Introduction to Python Programming	3	1	1-2 Spring & Fall		Dept. of Computer Science and Engineering
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spring & Fall		Dept. of Physics
FET219	Life Contingencies Practicum	1	1	2 Fall		Dept. of Finance,Dept. of MIS
FIN217	Investment and Risk Management	1	1	2 Fall		
FIN214	Securities Investment Practicum	1	1	2 Spring		
MIS204	Prescriptive Decision Analytics	3	1	2 Spring		
MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Python Programming	
EBA301	Data analysis and Data Mining	3	1	3 Fall	Data Management and Databases	
FIN314	Frontier and Practice of Securities Market	1	1	3 Fall	Microeconomics,Macroeconomics	
FET306	Business Analytics with Big Data	3	1	3 Spring		
FETS301	Internship	3	3	3 Summer		
FET470	Practice of Financial Theory	2	2	ANY		
FIN491	Thesis	12	12	4 Spring		
Total		38	28			

Curriculum Structure of Financial Engineering

Freshman	Sophomore	Junior	Senior
General Education Courses	General Education Courses	General Education Courses	General Education Courses
Microeconomics	Political Economics	Financial Investments	Practice of Financial Theory
Macroeconomics	Financial Accounting	Options, Futures and Financial Derivatives	Thesis
Probability and Statistics	Data Management and Databases	Financial Modeling and Analysis	Thesis
	Prescriptive Decision Analytics	Econometrics	
	Corporate Finance	Data analysis and Data Mining	
	Data Structure and Financial Applications	Artificial Intelligence and Its Applications in Finance	
	Major Elective Courses	Financial Risk Management	
		Internship	
		Major Elective Courses	
Note: The above is the recommended semester. Students can make adjustments according to their own academic plans.			