Program of Financial Mathematics for International Students (2019)

I. Introduction

In 2012 the Chinese Ministry of Education approved financial mathematics as a major in the field of economics. At present, more than 60 universities have been granted the right confer degrees in financial mathematics. Students enroll in schools or departments of mathematics and can obtain a Bachelor's degree in Economics.

In China option trading began in 2015. With the rapid development of networks, the scale of high-frequency trading via networks and aided by computer programming will also increase. In order to prevent financial crisis and to maintain the stability of financial markets, talents of financial risk management who have solid abilities in financial modeling and quantitative analysis are in urgent need. As a result, there is an urgent need in financial markets for talents with excellent foundation of mathematics, superb computer programming skills and a good understanding of finance. It is of great significance to develop the financial mathematics major well in order to cultivate high-end financial talents for China's financial industry

II. Objectives and Learning Outcomes

The objective for undergraduates majoring in financial mathematics is to cultivate high-level, applied and interdisciplinary financial talents who possess good professional ethics, solid theoretical basis of financial mathematics, superior abilities in data processing and computer programming, high level of foreign languages as well as innovative and entrepreneurial spirit, and are able to engage in financial data processing, model analysis, quantitative investment and risk management in all kinds of financial institutions, and to lay a theoretical foundation for them to pursue postgraduate studies.

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 (50 creidts)	Science	28
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses (13 creidts)	Humanities	4
	Social Sciences	4
	Arts	2
	Science	3
Major Course (61 creidts)	Major Foundational Courses	22
	Major Core Courses	25
	Major Elective Courses	15
	Research Projects, Internship and Undergraduate Thesis / Projects	10

Total (not including English courses)	133

IV. Discipline

Financial Mathematics

V. Main Courses

Foundational core courses:Calculus I A ,alculus II A, Linear Algebra A&Advanced Linear Algebra, Ordinary Differential Equations A, Theory of Functions of a Real Variable, Probability Theory, Mathematical Statistics, Applied Stochastic Processes, Macroeconomics, Microeconomics, Econometrics, Security Investments, Financial Economics, Models and Pricing of Financial Derivatives, Asset Pricing and Risk Management, and etc.

VI. Practice-Based Courses

Undergraduate Thesis/Project, Research Projects and Internship, etc.

VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of Second Year	MA101B	Calculus I A	
	MA102B	Calculus II A	MA101B
	MA107A	Linear Algebra A	
	MA109	Advanced Linear Algebra	MA107A
	PHY103B	General Physics B (I)	
	PHY105B	General Physics B (II)	PHY103B
	CS102B	Introduction to Computer Programming B	
	MA213-16	Real Analysis	MA102B
	MA215	Probability Theory	
	MA204	Mathematical Statistics	MA215

VIII. Requirements for GE Required Courses

(I) Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Prerequisite	Dept
MA101B	Calculus I A	4		4	1/Fall		MATH
MA102B	Calculus II A	4		4	1/Spr	MA101B	MATH
MA107A	Linear Algebra A	4		4	1/Fall		MATH
PHY103B	General Physics B (I)	4		4	1/Fall		PHY
PHY105B	General Physics B (II)	4		4	1/Spr	PHY103B	PHY
BIO102B	Introduction to Life Science	3		3	Spr/ Fall		BIO
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/ Fall		PHY
CS102B	Introduction to Computer Programming B	3	1	4	1/Spr Fall		CSE
	Total	28	3	31			

(II) 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	
GE231	Physical Education III	1		2	2/Fall	C	NA	
GE232	Physical Education IV	1		2	2/Spr	C	NA	
	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	
CLE027	Intermediate Chinese I	2	4	2/Fall	B	CLE009	
CLE028	Intermediate Chinese II	2	4	2/Spr	B	CLE027	
CLE031	Advanced Chinese I	2	4	3/Fall	B	CLE028	
CLE032	Advanced Chinese II	2	4	3/Spr	B	CLE031	

CLE033	Chinese Culture	2	2	Spr/Fall	B/E	NA	CLE/
CLE034	Chinese History	2	2	Spr/Fall	B/E	NA	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	
CLE022	SUSTech English II	4	4	E	CLE021	CLE
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 3 credits for Science Module.

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
CH101B	General Chemistry B	3		3	1/Spr/ Fall	E		CHEM
CS205	C/C++ Program Design	3	1	4	1/Spr	Er		CSE
	Total	6	1	7				

X. Major Course Arrangement

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

Course Category	Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
Major Foundational Courses	MA109	Advanced Linear Algebra	4		4	Spr	1/Spr	E	MA107A	MATH
	MA213-16	Real Analysis	5		4	Fall/Spr	2/Fall	E	MA102B	MATH
	MA215	Probability Theory	4		4	Fall	2/Fall	E	MA102a/ MA122/ MA102B	MATH
	FIN201	Microeconomics	3		3	Fall	2/Fall	C&E		FIN
	MA204	Mathematical Statistics	3		3	Spr	2/Spr	E	MA215/ MA212	MATH
	FIN204	Macroeconomics	3		3	Spr	2/Spr	C&E		FIN
	Total		22		21					
Major Core Courses	MA201a/ MA230	Ordinary Differential Equations A/ Ordinary Differential Equations A (H)	4		3	Spr	2/Spr	E	MA203a(/MA213-16) & MA109	MATH
	MA208	Applied Stochastic Processes	3		3	Spr	2/Spr	E	MA203a(/ MA213-16) &MA215(/ MA212) & MA109	MATH
	MA301	Theory of Functions of a Real Variable	3		3	Fall	3/Fall	E	MA203a/ MA213-16	MATH
	FMA304	Asset Pricing and Risk Management	3		3	Fall	3/Fall	C&E	MA204/MA212	MATH
	FMA303	Security Investments	3		3	Fall	3/Fall	C&E	MA215 /MA212	MATH
	FMA301	Econometrics	3		3	Spr	3/Spr	C&E	MA204 /MA212	MATH
	FMA307	Models and Pricing of Financial Derivatives	3		3	Spr	3/Spr	C&E	MA208	MATH
	FMA302	Financial Economics	3		3	Spr	3/Spr	C&E	MA215 /MA212	MATH
	Total		25		24					

Practical Courses	MA490	Undergraduate Thesis/Project	8	8		Spr	4/Spr	C&E		MATH
	MA480	Research Projects**	2	2						
	MA470	Internship**		2	16	Smr	Smr			
		Total	10	12	22					

**: Students are required to select one of the following two courses: MA480 Research Projects and MA470 Internship. Students can select them after the first academic year. The length of MA470 Internship is at least 4 weeks.

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.
MA110	MATLAB Programming and Application	3	1	3	Spr	2/Spr	E		MATH
CS205	C/C++ Program Design	3	1	4	Spr	1/Spr			CSE
CS203	Data Structures and Algorithm Analysis	3	1	4	Fall	2/Fall		CS205	CSE
FIN203	Financial Accounting	3		3	Fall	2/Fall	C&E		FIN
FIN213	Financial Markets and Institutions	3		3	Fall	2/Fall	C&E		FIN
FIN307	Database Management Systems and Financial Applications	3	1	4	Fall	2/Fall	C&E	CS209A	FIN
FIN206	Corporate Finance	3		3	Spr	2/Spr	C&E	FIN203	FIN
MA224	Foundation of Financial Mathematics	3		3	Spr	2/Spr	C&E	MA215 or MA212	MATH
MA202/ MA232	Complex Analysis/ Complex Analysis (H)	3		3	Spr	2/Spr	E	MA203a/MA213-16	MATH
MA206	Mathematical Modeling	3		4	Spr	2/Spr	E	MA201a or MA201b	MATH
MA214/ MA219	Abstract Algebra/ Abstract Algebra (H)	3		3	Spr	2/Spr	E	MA109	MATH
CS201	Discrete Mathematics	3		3	Spr	2/Spr	E	MA203aor MA213-16	CSE
MA303	Partial Differential Equations*	3		3	Fall	3/Fall	E	MA201a or MA201b	MATH
MA216	Computational Finance	3		3	Fall	3/Fall	E	MA215 (or MA212)&MA109	MATH
MA228	Nonlife actuarial models	3		3	Fall	3/Fall	E	MA215 or MA212	MATH
MA309	Time Series Analysis	3		3	Fall	3/Fall	C&E	MA204 or MA212	MATH
FIN301	Financial Investments	3		3	Fall	3/Fall	C&E	FIN201 & FIN204 & MA212	FIN
FIN411	International Finance	2		2	Fall	3/Fall	C&E		FIN
MA333	Introduction to Big Data Science	3		3	Fall	3/Fall	C&E	MA215 or MA212	MATH
MA329	Statistical Linear Models	3		3	Spr	3/Spr	E	MA204 or MA212	MATH
FIN306	Fixed Income: Models and Applications	2		2	Spr	3/Spr	C&E	FIN305	FIN
FIN208	Financial data analysis and Data Mining	3	1	4	Spr	3/Spr	C&E	MA212	FIN
FIN310	China Economics and Finance	3		3	Spr	3/Spr	C&E	FIN201 & FIN204	FIN
FIN407	Investment Banking	3		3	Spr	3/Spr	C&E	FIN206	FIN
MA302	Functional Analysis	3		3	Spr	3/Spr	E	MA301 & MA202 & MA109	MATH

MA304	Multivariate Statistical Analysis	3		3	Spr	3/Spr	C&E	MA204 or MA212	MATH
MA322	Life Insurance Actuarial Science	3		3	Spr	3/Spr	C&E	MA215 or MA212	MATH
FIN403	Cases in Financial Innovations	3	1	4	Fall	4/Fall	C&E		FIN
FIN409	Financial Modeling and Analysis	3		3	Fall	4/Fall	C&E	MA109 MA212	FIN
FIN413	Quantitative Investment Analysis	3		3	Fall	4/Fall	C&E	FIN303 & FIN301	FIN
MAT8011	Advanced Probability	3		3	Fall	4/Fall	E	MA215 & MA301	MATH
MAT7002	Measure Theory and Integration (PG)	3		3	Fall	4/Fall	E	MA302	MATH
MAT7030	Stochastic calculus and their applications in finance	3		3	Spr	4/Spr	E	MA301 & MA215	MATH
MAT7029	Stochastic Analysis	3		3	Spr	4/Spr	E	MA215 & MA301	MATH
	Total	100	6	106					

Notes:
1. Students are required to complete 15 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.
MA470	Internship*	2	2	16	Smr	Smr			MATH
MA480	Research Projects*	2	2	2	Fall				MATH
MA490	Undergraduate Thesis/Project	8	8	4	Spr	4/Spr			MATH
CS205	C/C++ Program Design	3	1	4	Spr	1/Spr	E		CSE
CS102B	Introduction to Computer Programming B	3	1	4	Spr/ Fall	1/Spr/ Fall	E		
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	E	CS205	CSE
MA207	Mathematical Experiments	3	1	4	Fall	2/Fall	E	MA203a /MA231 /MA213-16	MATH
FIN307	Database Management Systems and Financial Applications	3	1	4	Fall	2/Fall	C&E	CS209A	FIN
MA110	MATLAB Programming and Application	3	1	3	Spr	2/Spr	E		MATH
FIN208	Financial data analysis and Data Mining	3	1	4	Spr	3/Spr	C&E	MA212	FIN
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/ Fall	1/Spr	B		PHY
	Total	37	23	49					

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)	768	48	48	35.56%
General Education (GE) Elective Courses			13	9.63%
Major Foundational Courses	352	22	22	16.30%
Major Core Courses	400	25	25	18.52%
Major Elective Courses	1600	100	15	11.11%
Research Projects, Internship and Undergraduate Thesis/Projects		37	10	7.41%
Total (not including English courses)			133	

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

Curriculum Structure of Financial Mathematics

Financial Mathematics

First Year	Second Year	Third Year	Major Elective Courses

First Year

Fall
- Calculus I A
- Linear Algebra A

Spring
- Calculus II A
- Macroeconomics
- Advanced Linear Algebra

Second Year

Fall
- Real Analysis
- Microeconomics
- Probability Theory

Spring
- Mathematical Statistics
- Ordinary Differential Equations A
- Applied Stochastic Processes

Third Year

Fall
- Theory of Functions of a Real Variable
- Security Investments
- Econometrics

Spring
- Models and Pricing of Financial Derivatives
- Financial Economics
- Asset Pricing and Risk Management

Major Elective Courses
- Computational Finance
- Financial Accounting
- Introduction to Big Data Science
- Financial Market, Institutions and Regulations
- Financial Markets and Institutions
- Partial Differential Equations
- China Economics and Finance
- Life Insurance Actuarial Science
- Investment Banking
- Investment Banking
- Measure Theory and Integration（PG）