

Department of Mathematics

Mathematics and Applied Mathematics

I. Introduction

Established in 2012, Southern University of Science and Technology is a young university aiming to become a top research university in the world. In recent years, the university has attracted many outstanding researchers. The Department of Mathematics currently has 30 full-time faculty members, including 5 chair professors, 6 professors, 1 associate professor, 5 assistant professors and 4 visiting assistant professors. Three of the professors are members of the “Recruitment Program of Global Experts” and 2 are “Chang Jiang Scholars”, 2 are winners of the National Science Foundation Award for Distinguished Young Scholars, and 1 has received the “Young Overseas High-level Talents” award. In addition to the 21 research professors, there are 9 teaching professors dedicated to high quality teaching, and the department is expected to grow quickly in coming years.

Research interests of the current faculty members cover a wide array of areas in mathematics, including pure mathematics, applied mathematics, financial mathematics, computational mathematics and statistics. The department is committed to becoming a first class mathematics department with outstanding research and the highest quality undergraduate and graduate programs.

There are many jobs and opportunities for undergraduate students’ further academic development in mathematics and applied mathematics. Government agencies, banks, insurance companies, securities investment companies, software companies, market survey and analysis companies, e-commerce companies and many high-tech companies all have job opportunities for undergraduate students in

mathematics and applied mathematics. Students who wish to pursue graduate studies in mathematics and applied mathematics can also find many opportunities either in China or overseas.

II. Objectives

The objective of the undergraduate programs in mathematics and applied mathematics is to produce outstanding students with a solid foundation in mathematics, a broad knowledge base in related areas , and excellent ability of critical thinking and working independently. The department provides a wide variety of courses that will meet the needs of students' interests in pure mathematics and applied mathematics. The ultimate training objective of this undergraduate programs is to enable students to excel in their future career choices, no matter they choose to work in government or industries, or to become mathematical scientists.

III. Period of Study and Degree Requirement

Time length: 4 years.

Degree conferred: Students who have completed the major requirements of the undergraduate program will be awarded the Bachelor's degree of Economics.

The Minimum Credit Requirement for graduation: 144.5 credits

IV. Discipline

Mathematics

V. Main Courses

Foundational core courses: Mathematical Analysis I&II&III, Linear Algebra I&II, Ordinary Differential Equations A, Complex Analysis, Probability Theory, Mathematical Statistics, Abstract Algebra, Numerical Analysis, Mathematical Modelling, Partial Differential Equations, Theory of Functions of a Real Variable, Functional Analysis, Programming and Database, and etc.

VI. Practice - Based Courses

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

VII. Course Structure and Credit Requirements

Scheme 1: Taking courses in Mathematical Analysis series

General Education (GE) Required Courses: 58.5 credits (including Linear Algebra I and excluding Calculus I & II);

General Education (GE) Elective Courses: 10 credits;

Major Foundational Courses: 14 credits (credits of Linear Algebra I are included in GE Required Courses);

Major Core Courses: 26 credits;

Major Elective Courses: 26 credits;

Undergraduate Thesis/Projects, Research Projects and Internship: 10 credits;

The Minimum Credit Requirement for graduation: 144.5 credits.

Scheme 2: Taking courses in Calculus series

General Education (GE) Required Courses: 66.5 credits (including Calculus I & II and Linear Algebra I);

General Education (GE) Elective Courses: 10 credits;

Major Foundational Courses: 4 credits (4 credits of Linear Algebra II are included);

Major Core Courses: 26 credits;

Major Elective Courses: 28 credits;

Undergraduate Thesis/Projects, Research Projects and Internship: 10 credits;

The Minimum Credit Requirement for graduation: 144.5 credits.

Note: Credits of required courses exclude undergraduate thesis/projects, research projects and internship credits, but include that of laboratory courses of theory courses.

VIII. Course Arrangement

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

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours /week	Terms	Advised term to take the	Instruction language	Prerequisite	Dept.
Major Foundational Courses	MA101a /MA101b	Mathematical Analysis I/ Calculus I	5/4		4	Fall/ Fall & Spr.	1/Fall	C&E/ C or E or C&E	NA	MATH
	MA103b	Linear Algebra I	4		4	Spr.	1/Spr.	C or E or C&E	NA	MATH
	MA102a /MA102b	Mathematical Analysis II/ Calculus II	5/4		4	Spr. / Fall & Spr.	1/Spr.	C&E/ C or E or C&E	Mathematical Analysis I /Calculus I	MATH
	MA104b	Linear Algebra II	4		4	Fall	1/Fall	C or E or C&E	Linea Algebra I	MATH
	Total		18 /16		16					
Major Core Courses	MA203a /MA213	Mathematical Analysis III/ Real Analysis	5		4	Fall	2/Fall	C&E	Mathematical Analysis I&II / Calculus I&II	MATH
	MA215	Probability Theory	4		3	Fall	2/Fall	E	Calculus I&II (or Mathematical Analysis I&II), Linear Algebra I&II	MATH
	MA204	Mathematical Statistics	4		3	Spr.	2/Spr.	C or E or C&E	Mathematical Analysis I&II (or Calculus I&II); Linear Algebra I&II; Probability Theory (or Probability and Statistics)	MATH
	MA201a	Ordinary Differential Equations A	4		3	Spr.	2/Spr.	C or E or C&E	Mathematical Analysis I& II&III (or Calculus I&II and Real Analysis), Linear Algebra I&II	MATH
	MA202	Complex Analysis	3		3	Spr.	2/Spr.	C&E	Mathematical Analysis I & II & III (or Calculus I & II); Linear Algebra I	MATH
	MA301	Theory of Functions of a Real Variable	3		3	Fall	3/Fall	C or E	Mathematical Analysis I&II&III (Calculus I&II and Real Analysis)	MATH
	MA303	Partial Differential Equations	3		3	Fall	3/Fall	C or E or C&E	Calculus I&II (Mathematical Analysis I & II & III), Linear Algebra I, Ordinary Differential Equations A or B	MATH
	Total		26		22					

MA490	Undergraduate Thesis/Project	8	8	16	Fall & Spr.	4/Spr. & Fall	C&E		MATH
MA480	Research Projects*	2	2	4	Fall or Spr. or Smr.	Any semester after the first school year	C&E		MATH
MA470	Internship*			16	Smr.	Any summer after the first school year	C&E		MATH
Total		54 /5 2	10	74					

Note: Students can choose series of mathematical analysis I, II & III (students who will engage in academic research are advised to choose this series) or series of Calculus I & II and mathematical analysis. Minimum credits of Major Foundational Courses are 14/4, and minimum required credits of Major Required Courses are 40/30 (credits of Calculus I & II and Linear Algebra I are included in GE Required Courses), but total required credits of such two series are the same.

*Note: Students are required to choose Research Projects (including all kinds of scientific research activities, scientific and technological innovation projects, winning prizes in competitions above the provincial level, publishing papers, engaging in advanced studies both at home and abroad as well as attending a certain number of seminars or public lectures, and related credits are identified by the Department) and one course in Internship to carry out practice. Students can also choose to carry out Research Projects and Internship in any semester after the first school year, and the minimum required period for Internship is 4 weeks.

Table 2: Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours /week	Terms	Advised term to take the	Instruction language	Prerequisite	Dept.
MA105	Mathematical Logic	3		3	Fall	1/Fall	C	NA	MATH
MA106	C/C++ Programming language	3	1	4	Spr.	1/Spr.	C	Programming and Database will be helpful but not necessary	MATH
MA108	Programming and Database	3	1	4	Spr.	1/Spr.	C	NA	MATH
MA110	MATLAB Programming and Application	3		3	Fall	2/Fall	C or E or C&E	Linear Algebra I&II	MATH
MA209	Elementary Number Theory	3		3	Fall	2/Fall	C&E	NA	MATH
MA216	Computational Finance	3		3	Fall	3/Fall	C&E	Calculus I & II (or Mathematical Analysis I&II), Linear Algebra I&II, Probability Theory (or Probability and Statistics)	MATH
MA211	Data structure and algorithms	3	1	4	Fall	2/Fall	C	Programming and Database or C/C++ Programming language	MATH
MA207	Mathematical Experiments	3	1	4	Fall	2/Fall	C&E	Mathematics Analysis I&II (or Calculus I & II), Linear Algebra I	MATH
MA214	Abstract Algebra	3		3	Spr.	2/Spr.	C or E or C&E	Linea Algebra I&II	MATH
MA205	Discrete Mathematics	3		3	Spr.	2/Spr.	C	Calculus I&II (Mathematical Analysis I&II&III), Linear Algebra I	MATH
MA206	Mathematical Modelling	3		3	Spr.	2/Spr.	C&E	Mathematics Analysis I&II (or Calculus I&II), Linear Algebra I	MATH
MA208	Applied Stochastic Processes	4		3	Spr.	2/Spr.	E	Mathematical Analysis I&II&III (Calculus I&II and Real Analysis), Linear Algebra I&II, Probability Theory (or Probability and Statistics)	MATH
MA210	Operations Research	3		3	Spr.	2/Spr.	C	Mathematical Analysis I&II (Calculus I&II)	MATH
GE106	Computer System Design and Application	3	1	4	Spr.	2/Spr.			Comp. Sci.& Eng.
MA331	Parallel Computing	3	1	4	Fall	3/Fall	C	Data structure and algorithms	MATH
MA314	Sample Survey	3		3	Fall	3/Fall	E	Mathematical Statistics (or Probability and Statistics)	MATH
MA333	Introduction to Big Data Science	3		3	Fall	3/Fall	C&E	Calculus I & II (or Mathematical Analysis I&II), Linear Algebra I&II, Probability Theory (or Probability and Statistics)	MATH
MA306	Algebraic Geometry	3		3	Fall	4/Fall	C	Differential Geometry, Topology	MATH
MA321	Representations	3		3	Fall	3/Fall	C or E or	Linea Algebra I&II, Abstract	MATH

	of finite groups						C&E	algebra	
GGC5001	Mathematics Writing in English (PG)	3		3	Fall	3/Fall	C&E	English for Academic Purposes I&II&III&IV, Calculus I&II(or Mathematical Analysis I&II&III), and Linear Algebra I&II	MATH
MA305	Numerical Analysis	3		3	Spr.	3/Fall	C	Calculus I&II (or Mathematical Analysis I&II&III), Linear Algebra I&II	MATH
MA323	拓扑学 Topology	3		3	Fall	3/Fall	C	Abstract Algebra	MATH
FMA317	Applied Financial Statistics	3		3	Fall	3/Fall	C	Mathematical Analysis I&II&III (Calculus I&II), Linear Algebra I&II, Mathematical Statistics (or Probability and Statistics), Time Series Analysis, Econometrics	MATH
MA319	Combinatorics and graph theory	3		3	Fall	3/Fall	C or E or C&E	Linea Algebra I&II, Abstract Algebra (or Representations of finite groups)	MATH
FMA309	Time Series Analysis	3		3	Fall	3/Fall	C	Mathematical Analysis I&II&III (Calculus I&II), Linear Algebra I&II, Mathematical Statistics (or Probability and Statistics)	MATH
MA313	Stochastic Analysis	3		3	Spr.	3/Spr.	C or E	Mathematical Analysis I&II (or Calculus I&II), Theory of Functions of a Real Variable	MATH
MA220	Topics on Computational Mathematics	3		3	Smr.	2/Smr.	C or E or C&E	prerequisites determined by the instructor	MATH
MA304	Multivariate Statistical Analysis	3		3	Spr.	3/Spr.	C	Mathematical Analysis I&II&III (Calculus I&II), Linear Algebra I&II, Mathematical Statistics (or Probability and Statistics)	MATH
MA302	Functional Analysis	3		3	Spr.	3/Spr.	C&E	Mathematical Analysis I&II&III (Calculus I&II and Real Analysis), Linear Algebra I&II	MATH
MA328	Mathematical Intro to Fluid Mechanics	3		3	Spr.	3/Spr.	C&E	Calculus I&II (or Mathematical Analysis I&II&III), Linear Algebra I, Ordinary Differential Equations A or B, Partial Differential Equations	MATH
MA325	Numerical Solutions to Partial Differential Equations	3		3	Spr.	3/Spr.	C&E	Calculus I&II (or Mathematical Analysis I&II&III), Linear Algebra I&II, Ordinary Differential Equations A or B, Partial Differential Equations	MATH
MA310	Mathematical Biology	3		3	Spr.	3/Spr.	C or E or C&E	Mathematics Analysis I&II (or Calculus I&II), Linear Algebra I, Ordinary Differential Equation A or B	MATH
MA324	Frontiers of Mathematics	3		3	Spr.	3/Spr.	C or E or C&E	prerequisites determined by the instructor	MATH
MA308	Statistical Computation and Software	3.5	0.5	4	Spr.	3/Spr.	C or E or C&E	Probability and Statistics (or Probability Theory & Mathematical Statistics),	MATH

								Statistical Linear Models	
MA329	Statistical Linear Models	3		3	Spr.	3/Spr.	E	Mathematical Statistics (or Probability and Statistics)	MATH
MA327	Differential Geometry	3		3	Spr.	3/Spr.	C	Mathematics Analysis I&II&III (or Calculus I & II and Real Analysis), Linear Algebra I, Ordinary Differential Equations A or B	MATH
MAT7002	Measure Theory and Integration (PG)	3		3	Fall	4/Fall	C or E or C&E	Theory of Functions of a Real Variable (Complex Analysis and Functional Analysis will be helpful but not necessary)	MATH
MAT7003	Functional Analysis (PG)	3		3	Fall	4/Fall	C or E or C&E	Linear Algebra I&II, Complex Analysis, Theory of Functions of a Real Variable, Functional Analysis	MATH
MA417	Nonparametric Statistics	3		3	Fall	4/Fall	E	Mathematical Statistics (or Probability and Statistics)	MATH
MA413 /MAT7008	Advanced Statistics/ Advanced Statistics(PG)	3		3	Fall	4/Fall	C or E or C&E	Probability and Statistics (or Probability Theory & Mathematical Statistics)	MATH
FMA407	Topics on Financial Mathematics	3		3	Fall	4/Fall	C or E or C&E	prerequisites determined by the instructor	MATH
FMA415	Topics on Financial Mathematics: Dynamics of finance	3		3	Fall	4/Fall	C&E	Mathematical Analysis I&II&III (or Calculus I&II and Real Analysis), Linear Algebra I&II, Ordinary Differential Equations A or B, Security Investment	MATH
MA405	Survival Analysis	3		3	Fall	4/Fall	E	Mathematical Statistics (or Probability and Statistics), and Statistical Linear Models	MATH
MA402	Computational Statistics with R	3		3	Fall	4/Fall	C or E or C&E	Probability and Statistics (or Probability Theory & Mathematical Statistics), Statistical Linear Models	MATH
MA409	Statistical Data Analysis with SAS	3.5	0.5	4	Spr.	4/Fall	C or E or C&E	Probability and Statistics (or Probability Theory & Mathematical Statistics), Statistical Linear Models	MATH
MA401	Dynamical Systems	3		3	Fall	4/Fall	C&E	Mathematical Analysis I&II&III (Calculus I&II), Linear Algebra I & II, Ordinary Differential Equations A or B	MATH
MA403	Generalized Linear Models	3		3	Spr.	4/Spr.	E	Mathematical Statistics (or Probability and Statistics), and Statistical Linear Models	MATH
MA418	Design of Experiments	3		3	Spr.	4/Spr.	E	Mathematical Statistics (or Probability and Statistics), and Statistical Linear Models	MATH
MA412	Selected Research Topics in Statistics	3		3	Spr.	4/Spr.	C or E or C&E	Probability and Statistics (or Probability Theory & Mathematical Statistics) , Statistical Linear Models	MATH
MA406	Topics on Applied Mathematics	3		3	Spr.	4/Spr.	C or E	prerequisites determined by the instructor	MATH
Total		152	7	158					

Note 1: Each student is required to take at least 26 credits (for Mathematical Analysis series) or 28 credits (for Calculus series).

Note 2: Beginning time for Elective Courses is subject to the actual beginning time.

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours /week	Terms	Advised term to take the	Instruction language	Prerequisite	Dept.
MA106	C/C++ Programming language	3	1	4	Spr.	1/Spr.	C	Programming and Database will be helpful but not necessary	MATH
MA108	Programming and Database	3	1	4	Spr.	1/Spr.	C	NA	MATH
MA211	Data structure and algorithms	3	1	4	Fall	2/Fall	C	Programming and Database or C/C++ Programming language	MATH
MA207	Mathematical Experiments	3	1	4	Fall	2/Fall	C&E	Mathematics Analysis I & II (or Calculus I & II), Linear Algebra I	MATH
GE106	Computer System Design and Applications	3	1	4	Spr.	2/Spr.			Comp. Sci. & Eng.
MA331	Parallel Computing	3	1	4	Fall	3/Fall	C	Data structure and algorithms	MATH
MA308	Statistical Computation and Software	3.5	0.5	4	Spr.	3/Spr.	C or E or C&E	Probability and Statistics (or Probability Theory & Mathematical Statistics), Statistical Linear Models	MATH
MA409	Statistical Data Analysis with SAS	3.5	0.	4	Spr.	4/Fall	C or E or C&E	Probability and Statistics (or Probability Theory & Mathematical Statistics), Statistical Linear Models	MATH
MA490	Undergraduate Thesis/Project	8	8	16	Fall & Spr.	4/Spr. & Fall	C&E		MATH
MA480	Research Projects*	2	2	4	Fall or Spr. or Smr.	Any semester after the first school year	C&E		MATH
MA470	Internship*	2	2	16	Smr.	Any summer after the first school year	C&E		MATH
Total		37	19	68					
*Note: Students are required to choose Research Projects (including all kinds of scientific research activities, scientific and technological innovation projects, winning prizes in competitions above the provincial level, publishing papers, engaging in									

advanced studies both at home and abroad as well as attending a certain number of seminars or public lectures, and related credits are identified by the Department) and one course in Internship to carry out practice. Students can also choose to carry out Research Projects and Internship in any semester after the first school year, and the minimum required period for Internship is 4 weeks.

Table 4: Overview of Course Hours and Credits

Scheme 1: Taking courses in Mathematical Analysis series

	Total Course Hours	Total Credits	The Minimum Credit Requirement
General Education (GE) Required Courses	1040	58.5	58.5
General Education (GE) Elective Courses	2144	134	10
Major Foundational Courses	192	14	14
Major Core Courses	352	26	26
Major Elective Courses	2528	152	26
Internship, Research Projects, and Undergraduate Thesis/Projects	416	12	10
Total	6672	396.5	144.5

Scheme 2: Taking courses in Calculus series

	Total Course Hours	Total Credits	The Minimum Credit Requirement
General Education (GE) Required Courses	1168	66.5	66.5
General Education (GE) Elective Courses	2144	134	10
Major Foundational Courses	64	4	4
Major Core Courses	352	24	26
Major Elective Courses	2528	152	28
Internship, Research Projects, and Undergraduate Thesis/Projects	416	12	10
Total	6672	392.5	144.5