

## **Department of Mathematics**

### **Program of Mathematics and Applied Mathematics for International Students (2021)**

#### **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 44 full-time faculty members. Our faculty members' research covers a broad range of areas including Mathematics (dynamical systems, algebra and combinatorics, algebraic number theory, PDEs, mathematical physics and differential geometry, etc.), Computational and Applied Mathematics (applied mathematics, numerical analysis, computational fluid dynamics, scientific computing, inverse problems, data science, etc.), Probability and Statistics, and Financial Mathematics.

There are many jobs and opportunities for further academic development for undergraduate students in mathematics and applied mathematics. Government agencies, banks, insurance companies, securities investment companies, software developers, 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 and Learning Outcomes**

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 such as scientific computing and other areas of science, and excellent ability of critical thinking and working independently. The department provides a wide variety of courses that will meet the needs of students interested in pure mathematics and applied mathematics. The ultimate training objective of the undergraduate programs is to enable students to excel in their future career choices, whether they choose to work in government or industries, or to become mathematical scientists.

#### **III. Study Length and Graduation Requirements**

Study length: 4 years

Degree conferred: Bachelor of Science

The minimum credit requirement for graduation: 129 credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (48 credits)	Science	28
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses (13 credits)	Humanities	4
	Social Sciences	4
	Arts	2
	Science	3
Major Course (68 credits)	Major Foundational Courses	12
	Major Core Courses	13
	Major Elective Courses	33
	Research Projects, Internship and Undergraduate Thesis / Projects	10
Total (not including English courses)		129

#### IV. Discipline

Mathematics and Applied Mathematics

#### V. Main Courses

Foundational core courses: Calculus I A, Calculus II A, Mathematical Analysis, Linear Algebra A&Advanced Linear Algebra, Ordinary Differential Equations A, Complex Analysis, Real Analysis, Probability and Statistics, Abstract Algebra, Elementary Number Theory, Numerical Analysis, Mathematical Modeling, Partial Differential Equations, , Functional Analysis 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
	MA213-16	Mathematical Analysis	MA102B
	MA212	Probability and Statistics	MA102B
	PHY103B	General Physics B (I)	
	PHY105B	General Physics B (II)	PHY103B

## 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	Spr/ Fall	B		MATH
MA102B	Calculus II A	4		4	Spr/ Fall	B	MA101B	MATH
MA107A	Linear Algebra A	4		4	Spr/ Fall	B		MATH
PHY103B	General Physics B (I)	4		4	Spr/ Fall	B		PHY
PHY105B	General Physics B (II)	4		4	Spr/ Fall	B	PHY103B	PHY
BIO102B	Introduction to Life Science	3		3	Fall/ Spr	B		BIO
CS102B	Introduction to Computer Programming B	3	1	4	Spr/ Fall	B		CSE
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/ Fall	B	PHY103B	PHY
<b>Total</b>		<b>28</b>	<b>3</b>	<b>31</b>				

### (II) Physical Education

Course Code	Course Name	Credits	Hours/week	Terms	Instruction language	Prerequisite	Dept.
GE131	Physical Education I	1	2	Fall	C	NA	PE Center
GE132	Physical Education II	1	2	Spr	C	NA	
GE231	Physical Education III	1	2	Fall	C	NA	
GE232	Physical Education IV	1	2	Spr	C	NA	
GE331	Physical Education V	0	2	Fall	C	NA	
GE332	Physical Education VI	0	2	Spr	C	NA	
<b>Total</b>		<b>4</b>	<b>12</b>				

GE131, GE132, GE231, GE232, GE331, GE332 are required PE courses offered by Center For Physical Education. Students are required to select a specific sport program each semester. Student who meets the exemption conditions stated in "SUSTech Physical Education Course Exemption Regulation" can apply for exemption from GE331 and GE332.

### (III) Chinese Languages & Culture

Course Code	Course Name	Credit	Hours/week	Term	Instruction Language	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/ HUM/ SSC
CLE034	Chinese History	2	2	Spr/Fall	B/E	NA	
Total		16	28				

### (IV) English Language

Students will undertake the English Placement Test and be placed into three levels according to the result of the test and their performance in the National College Entrance Exam. Students at different levels are required to take the courses with a different credit value in total.

Level A: 8 credits; SUSTech English III, English for Academic Purposes and 2-credit CLE elective course

Level B: 12 credits; SUSTech English II, SUSTech English III, English for Academic Purposes, and 2-credit CLE elective course

Level C: 14 credits; SUSTech English I, SUSTech English II, SUSTech English III, and English for Academic Purposes.

#### List of English Language Courses

Course Code	Course Name	Credit	Hours/week	Instruction Language	Prerequisite	Dept	Notes
CLE021	SUSTech English I	4	4	E	NA	CLE	Required
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		
/	(at least one 2-credit CLE elective course)	2	2	E	CLE030		Level A & B Required

## 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	Spr/ Fall	E		CHEM
CS205	C/C++ Program Design	3	1	4	Spr	E		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	take the course Advised term to	Instruction language	Prerequisite	Dept.
Major Foundational Courses	MA109	Advanced Linear Algebra	4		4	Spr	1/Spr	E	MA107A	MATH
	MA213-16	Mathematical Analysis	5		4	Fall/Spr	2/Fall	E	MA102B	MATH
	MA212	Probability and Statistics	3		3	Fall	2/Fall	E	MA102B	MATH
	Total		12		11					
Major Core Courses	MA202	Complex Analysis	3		3	Spr	2/Spr	E	MA213-16	MATH
	MA201a	Ordinary Differential Equations A	4		3	Spr	2/Spr	E	MA213-16 & MA109	MATH
	MA301	Real Analysis	3		3	Fall	3/Fall	E	MA213-16	MATH
	MA303	Partial Differential Equations	3		3	Fall	3/Fall	E	MA201a	MATH
	Total		13		12					
Major Practice-Based Courses	MA490	Undergraduate Thesis/Project	8	8	4	Fall/Spr	4/Spr			MATH
	MA480	Research Projects*	2	2	2	Fall/Spr/Smr	Any semester after the first school year			MATH
	MA470	Internship*		2	16	Smr	Any summer after the first school year			MATH
	Total		10	12	22					
<p>*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.</p>										

**Table 2: Major Elective Courses**

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	E	CS205	CSE
CS205	C/C++ Program Design	3	1	4	Spr	1/Spr			CSE
MA209-16	Elementary Number Theory	3		3	Fall	2/Fall	E	MA109	MATH
MA110	MATLAB Programming and Application	3	1	4	Spr	2/Spr	E		MATH
CS201	Discrete Mathematics	3		3	Spr	2/Spr	C&E	MA107A& MA102B	CSE
MA206	Mathematical Modeling	3		3	Spr	2/Spr	C&E	MA201a/ MA201b	MATH
MA214	Abstract Algebra	3		3	Spr	2/Spr	E	MA109	MATH
MA208	Applied Stochastic Processes	3		3	Spr	2/Spr	E	MA213-16 & (MA215/MA212) & MA109	MATH
MAS221	The Basic Principle of Statistical Learning	2		8	Smr	2/Smr	C&E	MA215 / MA212	MATH
MA207	Mathematical Experiments	3	1	4	Fall	3/Fall	C&E	MA213-16	MATH
MA210	Operations Research	3		3	Spr	2/Spr	E	MA203a/MA231 /MA213-16	MATH
MA216	Computational Finance	3		3	Fall	3/Fall	E	(MA215/MA212) & MA109	MATH
MA323	Topology	3		3	Fall	3/Fall	E	MA214	MATH
MA321	Representations of groups	3		3	Fall	3/Fall	E	MA214	MATH
MA320	Mathematics Writing in English	3		3	Fall	3/Fall	E		MATH
MA329	Statistical Linear Models	3		3	Fall	3/Fall	E	MA204/ MA212	STAT
MA302	Functional Analysis	3		3	Spr	3/Spr	E	MA301& MA202& MA109	MATH
MA314	Sample Surveys	3		3	Spr	3/Spr	E	MA204/ MA212	STAT
MA327	Differential Geometry	3		3	Spr	3/Spr	E	MA201a/ M201b	MATH
MA333	Introduction to Big Data Science	3		3	Spr	3/Spr	E	MA215/MA212	MATH
MA401	Dynamical Systems	3		3	Fall	4/Fall	E	MA201a/ MA201b	MATH
MAT8006	Scientific Computing	3		3	Fall	4/Fall	E	MA201a	MATH
MAT7001	Algebra (Graduate)	3		3	Fall	4/Fall	E	MA214	MATH
MAT7002	Measure Theory and Integration (PG)	3		3	Fall	4/Fall	E	MA301	MATH
MAT7012	Algebraic Graph Theory	3		3	Spr	4/Spr	B	MA214	MATH

MAT8010	Combinatorics	3		3	Spr	4/Spr	E	MA214	MATH
<b>Total</b>		77	4	87					

Notes:

1. Students are required to complete 33 credits for the Major Elective Courses.



**Table 3: Overview of Practice-Based Courses**

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept
MA470	Internship*	2	2	16	Fall & Spr	4/Spr			MATH
MA480	Research Projects*	2	2	2	Fall/Spr/Smr	Any semester after the first school year			MATH
MA490	Undergraduate Thesis/Project	8	8	4	Smr	Any summer after the first school year			MATH
MA207	Mathematical Experiments	3	1	4	Fall	2/Fall	E	MA213-16	MATH
MA110	MATLAB Programming and Application	3	1	4	Spr	2/Spr	E		MATH
CS205	C/C++ Program Design	3	1	4	Spr	1/Spr	E		CSE
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	E	CS205	CSE
CS102B	Introduction to Computer Programming B	3	1	4	Fall/Spr	1/Spr & Fall	E		
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/Fall	B	PHY 103B	PHY	
<b>Total</b>		29	19	46					

**Table 4: Overview of Course Hours and Credits**

<b>Course Category</b>	<b>Total Course Hours</b>	<b>Total Credits</b>	<b>Credit Requirements</b>	<b>Percentage of the Total*</b>
<b>General Education (GE) Required Courses (not including English courses)</b>	768	48	48	35.56%
<b>General Education (GE) Elective Courses</b>			13	9.63%
<b>Major Foundational Courses</b>	176	12	12	8.89%
<b>Major Core Courses</b>	144	13	13	9.63%
<b>Major Elective Courses</b>	1232	77	33	24.44%
<b>Research Projects, Internship and Undergraduate Thesis/Projects</b>			10	7.41%
<b>Total (not including English courses)</b>			129	

# Curriculum Structure of Mathematics and Applied Mathematics

## Mathematics and Applied Mathematics

