Department of Statistics and Data Science

Program of Statistics for International Students (2021)

I. Introduction

Established in April 2019, the Department of Statistics and Data Science aims to build up a world-class educational training and research center. The department is committed to cultivating top-notch talents with solid scientific knowledge, active thoughts, innovative awareness, and global vision. Until June 2021, the department has 14 full-time (3 of them will join soon) and 4 jointly appointed faculty members, including 4 Chair Professors, 4 Professors, 5 Associate Professors, 5 Tenure-track Assistant Professors and 1 Visiting Assistant Professor. All faculty members have extensive overseas study or work experiences. One member is an invited speaker at the International Congress of Mathematics, and IMS Medallion Lecturer. Two members are the winners of the prestigious State Natural Science Award (2nd class). At present, the department has two undergraduate programs, namely the Program of Statistics and the Program of Data Science and Big Data Technology, as well as two graduate programs (M.Phil. and Ph.D.), which cover a broad array of research areas including Biostatistics, Clinical Trial Design, High Dimensional Data Analysis, Random Matrix, Time Series, Bayesian Statistics, Financial Statistics, Limit Theory in Probability and Statistics, Data Science and Big Data Technology. Statistics is applied extensively in various disciplines, from natural sciences (like physics, chemistry, biomedicine, etc.) to social sciences and humanities, as well as business and government decision-making. The undergraduate program of Statistics focuses on applying probability theory to establish statistical models based on the collected data, conduct quantitative analysis, and make inferences and predictions to serve as the reference for decision-making.

II. Objectives and Learning Outcomes

The objective for international undergraduates majoring in statistics is to cultivate professional talents who are interested in statistical research or data analysis. International undergraduates in this major will have a solid theoretical foundation in mathematics and statistics, proficient computer programming skills, and be good at statistical modeling and analysis of real data. Moreover, they will be able to conduct further research related to statistics or engage in data analysis, data mining, statistical investigate, statistical information management in enterprises and government departments. In the era of big data, statistics faces a wealth of opportunities and challenges. Graduates of statistics major will have a strong theoretical background in statistics and a broad range of knowledge to seize the opportunities and meet the challenges.

The learning outcomes are:

1. Students should have a solid mathematical foundation, master the basic knowledge and

theories of statistics, and understand the basics of natural science, social science, engineering technologies related to biomedical statistics, social economic statistics, industrial statistics, etc.

2. Students should be able to proficiently read statistical literature in English, master the principal methods of literature search, information retrieval, and data query with modern information technology.

3. Students should be equipped with the essential skills of applying statistical knowledge and principles to analyze and solve practical problems. These skills include but are not limited to experienced in using computer (including commonly used tools, programming languages, and statistical software) and writing simple programs; design questionnaires, conduct survey, collect and process survey data; good communication skills and teamwork spirit.

III. Study Length and Graduation Requirements

Study length: 4 years

Degree conferred: Bachelor of Science

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

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (50 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	22
	Major Elective Courses	24
	Research Projects, Internship and Undergraduate Thesis / Projects	10
Total (not including English Language courses)		129

IV. Discipline

Major type: Statistics (0712); Major code: 071201.

V. Main Courses

The fundamental and core courses of the Bachelor Program in Statistics include: Mathematical Analysis I, II, III, Linear Algebra A, Probability Theory, Ordinary Differential Equations A, Mathematical Statistics, Statistical Linear Models, Statistical Computation and Software, Applied Stochastic Processes, Time Series Analysis, Statistical Data Analysis with SAS, Multivariate Statistical Analysis.

VI. Practice-Based Courses

Undergraduate Thesis / Project, Research Project, 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	NA
	MA102B	Calculus II A	MA101B
	MA213-16	Mathematical Analysis	MA102B
	MA107A	Linear Algebra A	NA
	MA215	Probability Theory	MA102B
	MA204	Mathematical Statistics	MA215
	PHY103B	General Physics B (I)	NA
	PHY105B	General Physics B (II)	PHY103B
	CS102B	Introduction to Compute Programming B	NA
NOTE: Major declaration at the end of first year is not accepted for international students. Students must also meet the requirements of English Language set by the university. Please refer to Section VIII (IV) below.			

VIII. Requirements for GE Required Courses

(I) Science Module

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

(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	
Total		4	12				

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	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/ 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	Language Instruction	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 at least 3 credits from the following courses for the

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	NA	CHEM
CS205	C/C++ Program Design	3	1	4	1/Spr	E	NA	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	MA213-16	Mathematical Analysis	5		4	Fall	2/Fall	B	MA102B	MATH
	MA215	Probability Theory	4		3	Spr/ Fall	1/Spr or 2/Fall	B	MA102a	
	MA204	Mathematical Statistics	3		3	Spr/ Fall	2/Fall or 2/Spr	B	MA215	
	Total		**12**	**0**	**10**					
Major Core Courses	MA201a	Ordinary Differential Equations A	4		3	Spr	2/Spr	E	MA203a and (MA109/MA111/ MA121)	MATH
	MA208	Applied Stochastic Processes	3		3	Spr	2/Spr	E	MA203a and MA215 and (MA109/MA111/ MA121)	
	MA329	Statistical Linear Models	3		3	Fall	3/Fall	E	MA204	STAT
	MA308	Statistical Computation and Software	3		3	Fall	3/Fall	B	MA204	
	MA309	Time Series Analysis	3		3	Fall	3/Fall	B	MA204	
	MA304	Multivariate Statistical Analysis	3		3	Spr	3/Spr	B	MA204	
	MA409	Statistical Data Analysis with SAS	3		3	Spr	3/Spr	B	MA329	
	Total		**22**	**0**	**21**					
Practice-based Courses	STA490	Undergraduate Thesis / Project	8	8	4	Spr	4/Spr	B	NA	STAT
	STA480	Research Projects**	2	2	2	NA	NA	B	NA	
	STA470	Internship**	2	2	16	Smr	Summer	NA	NA	
	Total		**10**	**12**	**22**					
Total			**44**	**12**	**53**					

NOTE: ** Students must choose a research innovation project (including various scientific research activities, scientific and technological innovation projects, awards of provincial and above competitions, publications, domestic or foreign advanced studies, participation in a certain number of seminars, etc., credits need to be recognized by the department) or an internship. Students can choose to complete the research innovation projects or internship in any semester after the first year. The minimum requirement for internship is 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.
MA109/MA111/MA121	Advanced Linear Algebra/ Advanced Linear Algebra II/ Advanced Linear Algebra II (H)	4		4	Spr	1/Spr	E	MA107A	MATH
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	E	CS205	CSE
STA217	Introduction to Data Science	3		3	Fall	2/Fall	E	MA102a/ MA102B	STAT
MA205	Discrete Mathematics	3		3	Spr	2/Spr	B	MA203a/ MA213	MATH
MA206	Mathematical Modeling	3		3	Spr	2/Spr	E	MA201a/ MA230/ MA201b	MATH
MA214/ MA219	Abstract Algebra/ Abstract Algebra (H)	3		3	Spr	2/Spr	E	MA109/MA 111/MA121	MATH
MA202/ MA232	Complex Analysis/ Complex Analysis (H)	3		3	Spr	2/Spr	E	MA203a/ MA213-16	MATH
MA322	Life Insurance Actuarial Science	3		3	Spr	2/Spr	B	MA215/ MA212	MATH
STA201	Operation Research and Optimization	3		3	Spr	2/Spr	E	MA107A	STAT
MAS221	The Basic Principle of Statistical Learning	2		8	Smr	2/Smr	E	MA215/ MA212	MATH
MA228	Nonlife actuarial models	3		3	Fall	3/Fall	E	MA215/ MA212	MATH
MA303	Partial Differential Equations	3		3	Fall	3/Fall	E	MA201a/ MA201b	MATH
MA301	Real Analysis	3		3	Fall	3/Fall	E	MA203a/ MA213-16	MATH
MA305	Numerical Analysis	3		3	Fall	3/Fall	B	MA203a/ MA213-16	MATH
MAT7035	Computational Statistics	3		3	Fall	3/Fall	E	MA204	STAT
MA314	Sample Surveys	3		3	Spr	3/Spr	B	MA204/ MA212	MATH
MA333	Introduction to Big Data Science	3		3	Spr	3/Spr	B	MA215/ MA212	MATH
MAT7104	Bayesian Statistics	3		3	Spr	3/Spr	B	MA329	STAT
MA417	Nonparametric Statistics	3		3	Spr	3/Spr	E	MA212/ MA204	STAT
MAT7101	Generalized Linear Models	3		3	Spr	3/Spr	E	MA329	STAT
MAT7102	Selected Research Topics in Statistics	3		3	Spr	3/Spr	E	MA204	STAT
STA404	Network Science and Computing	3		3	Spr	3/Spr	E	MA204	STAT
MA325	Numerical Solution of Partial Differential Equations	3		3	Spr	3/Spr	E	MA303	MATH
MAT7002	Measure Theory and Integration	3		3	Fall	4/Fall	E	MA302	MATH
MAT8031	Advanced Statistics	3		3	Fall	4/Fall	B	MA204	STAT

CS405	Machine Learning	3	1	4	Fall	4/Fall	C	MA107A and MA212	CSE
MA405	Survival Analysis	3		3	Fall	4/Fall	E	MA329	STAT
MAT8011	Advanced Probability	3		3	Fall	4/Fall	E	MA329	MATH
MAT7100	Statistical Deep Learning	3		3	Fall	4/Fall	E	MA329	STAT
MAT7029	Stochastic Analysis	3		3	Spr	4/Spr	E	MA215 and MA301	MATH
Total		**90**	**3**	**99**					
Note: 1. Students are required to complete 24 credits for the Major Elective Courses. 2. All major elective courses offered by the Department of Statistics can be certified as "Major Elective Courses" credits of the Statistics major including graduate courses that are open to undergraduates.									

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours / week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
STA470	Internship	2	2	16	Smr	Smr	NA	NA	STAT
STA480	Research Projects	2	2	2	NA	NA	B	NA	STAT
STA490	Undergraduate Thesis / Project	8	8	4	Spr	4/Spr	B	NA	STAT
CS102B	Introduction to Computer Programming B	3	1	4	Spr/Fall	1/Spr/Fall	B	NA	CSE
MA207	Mathematical Experiments	3	1	4	Fall	2/Fall	E	MA203a	MATH
MA110	MATLAB Programming and Application	3	1	4	Spr	2/Spr	E	NA	MATH
CS205	C/C++ Programming Design	3	1	4	Spr	1/Spr	E	NA	CSE
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	E	CS205	CSE
CS405	Machine Learning	3	1	4	Fall	4/Fall	B	MA107A and MA212	CSE
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/Fall	1/Spr/Fall	B	NA	PHY
Total		**32**	**20**	**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)	800	50	48	37.21%
General Education (GE) Elective Courses			13	10.08%
Major Foundational Courses	192	12	12	9.30%
Major Core Courses	352	22	22	17.05%
Major Elective Courses	1440	90	24	18.60%
Research Projects, Internship and Undergraduate Thesis/Projects		32	10	7.75%
Total (not including English courses)			129	100%

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

Curriculum Structure of the Program of Statistics for International Students (Only include Statistical Major Courses)

Fundamental and Core Courses

First Year	Second Year	Third Year
Fall	**Fall**	**Fall**
Calculus I A	Mathematical Analysis	Times Series Analysis
Linear Algebra A	Probability Theory	Statistical Computation and Software
		Statistical Linear Models
Spring	**Spring**	**Spring**
Calculus II A	Mathematical Statistics	Multivariate Statistical Analysis
Advanced Linear Algebra	Ordinary Differential Equations	Statistical Data Analysis with SAS
	Applied Stochastic Processes	

Elective Courses

Third/Fourth Year

Fall
- Computational Statistics
- Real Analysis
- Survival Analysis
- Advanced Statistics
- Statistical Deep Learning

Spring
- Introduction to Big Data Science
- Survey Sampling
- Bayesian Statistics
- Generalized Linear Models
- Network Science and Computing
- Selected Research Topics in Statistics