

# Applied Statistics

(Grade 2022)

Course code: 071202

## I. Cultivation Objectives

### 1. General cultivation objective

This Program of Applied Statistics cultivates high quality statistical talents with good moral and talent to meet the needs of national and regional economic development. Students will not only master the basic ideas, basic theories and methods of statistics and related computer technology, but also have knowledge of economics, finance and business, and will be able to engage in statistical investigation, statistical information management, data analysis and consultation, quantitative modelling and forecasting in government departments at all levels, enterprises and institutions in various industries, and the financial, securities and insurance industries.

### 2. Objective of value guidance

Takes the spirit of the model worker and the spirit of craftsmanship as the value orientation, this program cultivates craftsmanship and nurture talents with this spirit. In the implementation of education and teaching, we focus on cultivating a sense of integrity and a strong sense of social responsibility among students, establishing a sound professional personality and a sense of the rule of law, and inspiring a work ethic of excellence in data analysis and a love for statistics. Using professional knowledge, competence and literacy, students will contribute their wisdom and strength to statistics and economic development in China.

### 3. Five years after graduation, students in this programme should achieve the following objectives:

Have a clear career plan and good career prospects in various industries, achieve certain work achievements and be promoted in their posts, and become the mainstay and core player of their units. The sense of social responsibility will be further enhanced, and the ability to coordinate and manage work will be more prominent, with a certain degree of leadership ability. The ability to learn throughout life will be further enhanced, and through continuous learning on the job or further study domestically and internationally, they will be able to take on their own professional abilities, adapt to the needs of social development, have better innovation and entrepreneurial ability, and contribute to statistics and economic development in China.

## II. Graduation requirements

Students in this program mainly study the basic theories and knowledge of statistics, and should systematically master the basic theories, professional knowledge and business skills of Applied Statistics, with strong practical ability to work in the fields related to Applied Statistics and preliminary mastery of methods to solve complex problems in professional fields. Graduates are expected to achieve competencies in the following nine areas:

**1. Morality and Ethics:** Have good humanistic foundation, scientific spirit, professionalism and a sense of social responsibility, understanding of national and social conditions and practice core values of socialism.

1-1 Have correct values, moral values and legal consciousness, be patriotic, honest and law-abiding.

1-2 Have a strong sense of social responsibility and a good collaborative spirit.

1-3 Be physically healthy and mentally fit to keep up with the times and adapt to scientific and social developments and changes.

1-4 Develop a good cultural and scientific literacy and master a scientific world perspective and methodology.

**2. Professional knowledge:** Have solid basic knowledge, professional knowledge and professional skills, master the basic research methods of the profession, understand the latest developments and development trends of the profession and related fields.

2-1 Have a relatively sound knowledge of mathematics and rigorous mathematical logic, and be able to apply knowledge of Advanced Mathematics to solve mathematical problems encountered in the workplace.

2-2 Have a systematic understanding of basic knowledge and basic theory of statistics, the ability to quantitatively analyse all types of data and model data, and the ability to correctly use statistical ideas and methods to analyse and judge the calculation results of statistical software.

2-3 Master certain basic knowledge of economics, accounting and Electronic Commerce.

**3. Ability to innovate:** Have the ability to think logically and creatively, ability to identify, analyse and evaluate phenomena and problems in the profession and related fields, and to form personal judgements and opinions.

3-1 Have the ability to use creative thinking to conduct scientific research, with a strong spirit of innovation and certain creative ability.

3-2 Have consciousness of entrepreneurship and a willingness to explore ways and means of starting a business.

**4. Ability to use knowledge:** Have ability to solve complex problems. Ability to conduct comprehensive analysis and research on complex problems in the field of specialization and propose corresponding countermeasures or solutions.

4-1 Have strong search and retrieval skills of Chinese and foreign literature and materials.

4-2 Have strong writing, presentation, demonstration and reporting skills.

4-3 Have the ability to integrate industry knowledge and statistical methods to analyse, research and solve practical problems

**5. Ability to use Information:** Have the ability to use information technology, ability to apply modern information technology tools and instruments appropriately to solve practical problems.

5-1 Have basic knowledge of computers and databases and certain programming skills.

5-2 Be proficient in the use of statistical and other relevant computer software and be able to apply commonly used statistical software to analyse data and give reasonable explanations of socio-economic phenomena.

**6. Communication:** Have strong communication and presentation skills, ability to communicate effectively with peers and the public through verbal and written expressions:

6-1 Have the ability to communicate and express themselves in Mandarin or English.

6-2 Have good professionalism, listen and communicate well in all aspects of their work, and communicate clearly and accurately about the results of research in their area of expertise.

**7. Teamwork:** Have good teamwork skills, ability to work harmoniously and collaboratively with team members and to play an active role in team activities as a member or leader.

7-1 Be a strong team player and have a willingness to share and help others.

7-2 Be able to work with team members or follow leadership in the early stages of the job, and after three to five years can lead team members in various tasks.

**8. International Perspective:** Have an international perspective and international understanding. Have Understanding of international developments, concern for global issues, understanding and the differences and diversity of different cultures in the world.

8-1 Have strong listening, speaking, reading and writing skills in English to work with international partners.

8-2 Be able to follow the frontiers of international statistical disciplines, the latest methods, and the latest topical issues in the discipline.

**9. Learning and Development:** Have a sense of lifelong learning and the ability to self-manage and learn independently, and be able to adapt to social and personal sustainable development through continuous learning.

9-1 Have strong independent learning skills, ability to think independently and update knowledge.

9-2 Have the ability to keep abreast of the times, constantly learn new knowledge required for the job and have good adaptability to new positions, fields and responsibilities.

### III. Schooling System

Four years.

### IV. Length of Study

Flexible study period, generally four years, the minimum length of flexibility is not less than three years, the longest not more than six years.

### V. Requirements for Graduation and Degree Conferring

In order to graduate, students must complete the minimum number of credits required by the Instructive Cultivation Plan for each category of study and all the content required by the Extracurricular Class, with a total of 160 credits, and a Bachelor of Science degree if they meet the requirements for the award of a Bachelor's degree.

### VI. Discipline

Statistics.

### VII. Core Courses

Mathematical Analysis, Advanced Algebra, Fundamentals of Probability, Microeconomics, Macroeconomics, Introduction to Statistics, Mathematical Statistics, Sampling Techniques and Applications, Applied Multivariate Statistical Analysis, Applied Time Series Analysis, Applied Regression Analysis, Non-parametric Statistics, Data Mining, Fundamentals of Programming - C, Python Language Fundamentals, Introduction to Database Systems .

### VIII. Course Structure and Course Hours (excluding Extracurricular Class)

Category	Total Credit	%	Total Course Hours	Theory Learning	Practical Training
Public Fundamental Course	36.5	23	720	640	80
General Education	10	6	160	160	0
Professional Fundamental Course	41	26	656	592	64
Professional Course	43	27	688	576	112
Professional Practice	28.5	18	832	0	832
Total	159	100	3056	1968	1088
<b>Theory:Practical (%)</b>			64: 36		

## IX. Teaching schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Public Fundamental Course	required	School of Marxism	b1080001	Basic Principles of Marxism	test	3	48	42	6	Autumn 1
	required	School of Marxism	b1080009	Ethics and the Rule of Law	non-test	3	48	42	6	Autumn 1
	required	School of Marxism	b1080006	Outline of Modern Chinese History	non-test	3	48	42	6	Spring 1
	required	School of Marxism	b1080004	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics I	test	3	48	42	6	Autumn 2
	required	School of Marxism	b1080007	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics II	test	2	32	28	4	Spring 2
	required	School of Marxism	-----	Situation and Policy (Modules 1 to 4)	non-test	2	32	28	4	Autumn 1 to Spring 2
	required	School of Marxism	b1080008	Labour Education A	non-test	0.5	16	16		Spring 1
	required	College of Arts and Sciences	b1020018	Academic Chinese	non-test	2	32	32		Autumn 1
	required	College of Physical Education	-----	Physical Education I to VI	non-test	3	160	160		Autumn 1 to Autumn 4
	required	Others	b1110003	Military skills	non-test	0.5	2W			Autumn 1
	required	College of Arts and Sciences	b1110002	Military theory	non-test	0.5	32	32		Spring 1
	required	Engineering Training	b1090001	Basic Engineering Training	non-test	2	32		32	Autumn 1
	required	Others	b1110004	Mental Health Education for University Students	non-test	2	32	16	16	Spring 1
	★ Academic English(Select 1 Module for 10 Credits)	Module A	b1020003	General English III	test	3	48	48		Autumn 1
			b1020004	General English IV	test	3	48	48		Spring 1
			b1020005	General Academic English A	test	2	32	32		Autumn 2
			---	English Knowledge Expansion	non-test	2	32	32		Spring 2
		Module B	b1020002	General English II	test	3	48	48		Autumn 1
			b1020003	General English III	test	3	48	48		Spring 1
			b1020006	General Academic English B	test	2	32	32		Autumn 2
			---	English Knowledge Expansion	non-test	2	32	32		Spring 2
		Module C	b1020001	General English I	test	4	64	64		Autumn 1
			b1020002	General English II	test	3	48	48		Spring 1
b1020003			General English III	test	3	48	48		Autumn 2	
★ Academic German		College of Arts and Sciences	b1020040	Academic German I	test	3	48	48		Autumn 1
		College of Arts and Sciences	b1020041	Academic German II	test	3	48	48		Spring 1
	College of Arts and Sciences	b1020042	Academic German III	test	4	64	64		Autumn 2	
★ Academic Japanese	College of Arts and Sciences	b1020077	Academic Japanese I	test	3	48	48		Autumn 1	
	College of Arts and Sciences	b1020078	Academic Japanese II	test	3	48	48		Spring 1	
	College of Arts and Sciences	b1020079	Academic Japanese III	test	4	64	64		Autumn 2	
<b>Subtotal (Public Fundamental Course)</b>						<b>36.5</b>	<b>720</b>	<b>640</b>	<b>80</b>	
General Education	selective	Art Education Center	b0-----	Aesthetic Education	non-test	2	32	32		Autumn, Spring
	selective	Each College	b0-----	Social Sciences and Humanistic Qualities	non-test	4	64	64		Autumn, Spring
				Natural Sciences and Technology Innovation	non-test	4	64	64		Autumn, Spring
<b>Subtotal (General Education)</b>						<b>10</b>	<b>160</b>	<b>160</b>		

(★Note: The first foreign language is 10 credits in total, including 3 languages: Academic English, Academic German and Academic Japanese, choose the appropriate language as required; when Academic English is chosen, please choose the appropriate module in Module A, B, C)

## IX. Teaching schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Professional Fundamental Course	required	College of Arts and Sciences	b2022019	Mathematical Analysis I	test	6	96	96		Autumn 1
	required	College of Arts and Sciences	b2022140	Higher Algebra	test	4	64	64		Autumn 1
	required	School of Economics and Management	b2022114	Microeconomics	test	3	48	48		Autumn 1
	required	School of Economics and Management	b2022011	Principles of Accounting	test	2	32	32		Autumn 1
	required	College of Arts and Sciences	b2022138	Python Language Fundamentals	non-test	3	48	24	24	Spring 1
	required	College of Arts and Sciences	b2022020	Mathematical Analysis II	test	6	96	96		Spring 1
	required	College of Arts and Sciences	b2022116	Fundamentals of Probability Theory	test	4	64	64		Spring 1
	required	College of Arts and Sciences	b2022117	Introduction to Statistics	test	3	48	32	16	Spring 1
	required	School of Economics and Management	b2022118	Macroeconomics	test	3	48	48		Spring 1
required	College of Arts and Sciences	b2022120	Mathematical Statistics	test	3	48	40	8	Autumn 2	
required	School of Computer and Information Engineering	b2022165	Fundamentals of Programming (C)	test	4	64	48	16	Autumn 2	
<b>subtotal (Professional Fundamental Course)</b>						<b>41</b>	<b>656</b>	<b>592</b>	<b>64</b>	
Professional Course	required	College of Arts and Sciences	b2022141	the Program of Applied Statistics import	non-test	1	16	16		Autumn 1
	required	College of Arts and Sciences	b2022029	Operations Research	test	2	32	32		Autumn 2
	required	College of Arts and Sciences	b2022127	National Economic Statistics	test	2	32	32		Autumn 2
	required	College of Arts and Sciences	b2022123	Applying multivariate statistical analysis	test	4	64	48	16	Spring 2
	required	College of Arts and Sciences	b2022124	Applied regression analysis	test	3	48	32	16	Spring 2
	required	College of Arts and Sciences	b2022125	Sampling techniques and applications	test	2	32	32		Spring 2
	required	School of Computer and Information Engineering	b2022143	Introduction to Database Systems	non-test	2	32	24	8	Spring 2
	required	School of Computer and Information Engineering	b2012268	Linux operating system applications	non-test	3	48	24	24	Spring 2
	required	College of Arts and Sciences	b2022126	Applied time series analysis	test	3	48	32	16	Autumn 3
	required	College of Arts and Sciences	b2022006	Non-parametric statistics	test	2	32	32		Autumn 3
	required	College of Arts and Sciences	b2022002	Bayesian statistics	test	2	32	32		Autumn 3
	required	College of Arts and Sciences	b2022142	Market Research and Market Analysis	non-test	2	32	16	16	Autumn 3
	required	College of Arts and Sciences	b2022018	Data mining	non-test	3	48	32	16	Spring 3
	required	College of Arts and Sciences	b2022131	Attribute data analysis	test	2	32	32		Spring 3
	required	College of Arts and Sciences	b2022122	Econometrics	test	2	32	32		Spring 3
	required	College of Arts and Sciences	b2022003	E-commerce data analysis	non-test	2	32	32		Autumn 4
	<b>Subtotal(Required Professional Course)</b>						<b>37</b>	<b>592</b>	<b>480</b>	<b>112</b>
Select different courses in different modules for 6 credits	Module A	School of Computer and Information Engineering	b2012313	Cloud Computing and Data Centers	test	2	32	24	8	Spring 3
			b2022136	Machine Learning	non-test	2	32	32		Autumn 4
			b2012277	Network and Data Security	test	2	32	24	8	Autumn 4
	Module B	College of Arts and Sciences	b2022167	Advanced Probability Statistics	non-test	2	32	32		Autumn 4
			b2022132	Experimental design and analysis	test	2	32	32		Spring 3
			b2022023	Statistical forecasting and decision making						
School of Resources and Environment	b2013025	Introduction to Environmental Engineering	non-test	2	32	32		Autumn 4		
	b2022109	Introduction to Environmental Protection and Sustainability								
<b>Subtotal (Selective Professional Course)</b>						<b>6</b>	<b>96</b>	<b>96</b>		
<b>Subtotal (Professional Course)</b>						<b>43</b>	<b>688</b>	<b>576</b>	<b>112</b>	

### IX. Teaching schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Professional Practice	required	College of Arts and Sciences	b4022047	Spss statistical software	non-test	2	48		48	Summer 1
	required	College of Arts and Sciences	b4022048	R Language Fundamentals	non-test	2	48		48	Summer 1
	required	School of Computer and Information Engineering	b4022057	Database technology and applications	non-test	3	72		72	Summer 2
	required	College of Arts and Sciences	b4022014	Excel data processing and analysis	non-test	3	72		72	Summer 2
	required	College of Arts and Sciences	b4022018	Integrated training in social research and statistical analysis	non-test	3	72		72	Spring 3
	required	College of Arts and Sciences	b4000043	the Program of Applied Statistics Innovation and Entrepreneurship	non-test	2	48		48	Spring 3
	required	College of Arts and Sciences	b4020002	Labour Education B	non-test	0.5	16		16	Spring 3
	required	College of Arts and Sciences	b4022053	Python Language and Artificial Intelligence Applications	non-test	3	72		72	Summer 3
	required	College of Arts and Sciences	b4022051	R Advanced	non-test	2	48		48	Summer 3
	required	College of Arts and Sciences	b4022052	Selecting and writing a topic for a statistics paper	non-test	1	24		24	Autumn 4
	required	College of Arts and Sciences	b4022054	Comprehensive training of professional ability	non-test	1	24		24	Spring 4
	required	College of Arts and Sciences	b4022056	Applied Statistics Graduation Internship and Final Design (Thesis)	non-test	6	288		288	Spring 4
<b>Subtotal (Professional Practice)</b>							<b>28.5</b>	<b>832</b>	<b>832</b>	
Extracurricular Class	required	Others	b5110001	Extracurricular Class	non-test	1	-	-	-	Autumn, Spring, Summer
<b>Total</b>							<b>160</b>	<b>3056</b>	<b>1968</b>	<b>1088</b>

#### ★1, Description of Selective Professional Course:

Selective Professional Courses are divided into modules according to different competency requirements, and students must take one of the modules and achieve the required credits for that module.

**Module A:** Focuses on big data analysis and modelling in addition to integrated basic competencies.

**Module B:** Focuses on environment statistics and industrial statistics in addition to integrated basic competencies.

#### 2, Explanation of the relevance of professional certificates to the course:

The types and names of vocational qualifications relevant to the profession are as follows.

(1) Issued by the National Bureau of Statistics and the Ministry of Personnel: Junior Statistician Certificate (Certificate of Professional and Technical Qualification in Statistics).

(2) Issued by the National Bureau of Statistics and the Ministry of Education: Junior Survey Analyst (Certificate of Professional and Technical Qualification in Statistics).

(3) Issued by the Ministry of Personnel and the Ministry of Finance of the People's Republic of China: Junior Accountant's Certificate (Professional and Technical Accounting Qualification Certificate).

Students will be able to sit for the Technical Qualification Examination in Statistics and obtain the Junior Statistician Certificate through courses such as Introduction to Statistics, Mathematical Statistics, National Economic Statistics, Applied Multivariate Statistical Analysis, Applied Regression Analysis and Applied Time Series Analysis.

Students can take the Introduction to Statistics, Mathematical Statistics, Applied Multivariate Statistical Analysis, Applied Regression Analysis, Applied Time Series Analysis, Sampling Techniques and Applications, and Market Research and Market Analysis to obtain the Junior Survey Analyst qualification.

Students will be able to sit for the Professional Technical Accounting Qualification Examination and obtain the Junior Accountant qualification through the Principles of Accounting course.

## X. Prerequisite for Course Study

No.	Course Name	Prerequisite Course	No.	Course Name	Prerequisite Course
1	Mathematical Analysis II	Mathematical Analysis I	13	Operations Research	Linear Algebra
2	Fundamentals of Probability Theory	Calculus A	14	Bayesian statistics	Mathematical Statistics
3	Introduction to Statistics	Fundamentals of Probability Theory	15	Market Research and Market Analysis	Introduction to Statistics
4	Macroeconomics	Microeconomics	16	Experimental design and analysis	Mathematical Statistics
5	National Economic Statistics	Introduction to Statistics	17	Attribute data analysis	Applying multivariate statistical analysis
6	Mathematical Statistics	Introduction to Statistics	18	Data mining	Applying multivariate statistical analysis
7	Applying multivariate statistical analysis	Mathematical Statistics	19	E-commerce data analysis	Applying multivariate statistical analysis to data mining
8	Applied regression analysis	Mathematical Statistics	20	Linux operating system applications	Fundamentals of Programming -C
9	Non-parametric statistics	Mathematical Statistics	21	Network and Data Security	Introduction to Database Systems Fundamentals of Programming -C
10	Sampling techniques and applications	Mathematical Statistics	22	Machine Learning	Python Language Fundamentals Data mining
11	Applied time series analysis	Mathematical Statistics Applied regression analysis	23	Cloud Computing and Data Centers	Fundamentals of Programming -C
12	Econometrics	Applied regression analysis Applied time series analysis Macroeconomics	24	Statistical forecasting and decision making	Applied regression analysis Applied time series analysis Applying multivariate statistical analysis

## XI. Credit of Extracurricular Class

Through taking extracurricular classes, students are encouraged to take part in academic lectures, social practice activities, campus cultural and sports activities, innovative and entrepreneurial activities, voluntary activities, etc. to improve their social adaptability and enhance the competitiveness in the job market. Details are specified in Students' Manual.