Instructive Cultivation Plan for the Program of Economic Statistics

(Grade 2020)

Program Code: 020102

1. Orientation

This program cultivates applied technical talents with innovative spirit and strong sense of social responsibility, honesty and trustworthiness, good mathematics and economics literacy, and mastering the basic theories and methods of statistics.

2. Cultivation objectives

2.1 General Objective

This program cultivates high-quality applied professional talents with a comprehensive development of morality, intelligence, physique, aesthetics and labor, who have a good foundation on modern economics, who master the systematic statistics theories and methods, who are proficient in the use of computer for statistical information processing and data analysis, who are able to engage in statistical investigation, statistical information management, data analysis and consultation, quantitative modeling and prediction in government administrations at all levels, enterprises and institutions, financial, securities and insurance industry.

2.2 Cultivation Value

Create ingenuity and cultivate craftsman by taking the spirit of model workers and the spirit of craftsmen as the value orientation. In the process of education and teaching, we should pay attention to cultivating students' innovative spirit and strong sense of social responsibility, and creating students' rigorous and meticulous professional ethics and accomplishment, as well as work attitude towards the recognition and passion for economic statistics. Students may contribute wisdom and power to the statistical cause and economic development of our country by using the professional skills in economics and statistics.

3. Basic requirements

3.1 Requirement on Quality

3.1.1 Correct values and moral outlook, patriotic, honest, law-abiding.

3.1.2 Proper sense of social responsibility and proper spirit of cooperation.

3.1.3 Good cultural and scientific literacy, scientific world outlook and methodology.

3.1.4 Healthy physique and good psychological quality, may keep pace with the times and adapt to the development and change of science and society.

3.2 Requirement on Knowledge

3.2.1 More perfect mathematical knowledge and good mathematical foundation, be able to use mathematical methods to understand and analyze economic problems.

3.2.2 Firmly master the basic knowledge, basic theories and basic application skills of economics, master the internal relation between the law of economic operation and economic indexes.

3.2.3 Systematically master the basic knowledge and basic theories of economics, be able to carry out the quantification analysis and modelling for various types of data.

3.2.4 Be proficient in computer and modern information technology, be able to use modern information technology and database for literature retrieval, data processing, model design, research and analysis, and paper writing.

3.2.5 Be familiar with the principles and policies in respect of national economic development, and the laws and regulations in respect of statistics.

3.3 Requirement on Ability

3.3.1 Ability of autonomous learning, independent thinking.

3.3.2 Ability to search literature and collect information.

3.3.3 Ability to review literature, to communicate and exchange in English.

3.3.4 Ability to analyze and solve problems through the comprehensive use of professional theories and knowledge.

3.3.5 Ability to use creative thinking for scientific research, entrepreneurial and employment.

3.3.6 Strong communication and teamwork skills; strong writing and language expression skills.

3.4 Professional Certificate Requirement

3.4.1 Certificate of Junior Statistician (Certificate of Technical Qualification for Statistics) issued by the National Bureau of Statistics and the Ministry of Personnel.

3.4.2 Certificate of Junior Economist (Certificate of Technical Qualification for Economics) issued by the Ministry of Personnel.

3.5 Suitable Posts

3.5.1 Statisticians at all levels of government administration.

3.5.2 Survey planning and data analysis personnel for the market research department of companies or enterprises engaging in consultation and market research.

3.5.3 Statisticians and data analysts involved in business management.

3.5.4 Data analysts in finance, securities and insurance industries.

3.5.5 Data analysts in Internet finance, e-commerce and other industries.

4. Schooling System

Four-year undergraduate education

5. Duration

Generally four years. The shortest duration is not less than three years, and the longest is not more than six years.

6. Graduation and Academic Degree Awarding

Minimum Credits of Curriculum (required courses, practical trainings & extracurricular classes): 152.

Degree Awarded: Bachelor of Economics

7.   Major Disciplines

Economics

8.   Core Courses

8.1   Calculus

The course is an important basic theoretical course, which helps the students master the basic theory and methods of calculus. The course contents include: the concept, theory and calculation methods of set, function, derivative, integral, progression series.

8.2   Linear Algebra

This course is an important basic theoretical course, which helps the students master the elementary theoretical knowledge of algebra. The course contents include: the basic concept and theory of determinant, matrix, quadratic form, linear equation set, linear space and linear transformation.

8.3   Foundation of Probability Theory

This course is an important basic theoretical course, which introduces the random events and probability, the distribution and digital features of one-dimensional random variable and two-dimensional random variable, large number law and central limit theorem. Through the course, the students are able to master the basic concept, theory and application of probability, laying a necessary preparation and a good theoretical basis for the learning of following courses. Meanwhile, the course provides some theories and methods to solve practical problems.

8.4   Microeconomics

This course is an important professional foundation course. It mainly studies the economic behavior of individuals in the market, helps people understand the operation and function of market mechanism, and the ways to improve this operation. The main contents include: equilibrium price theory, consumer behavior theory, producer behavior theory, distribution theory, general equilibrium theory and welfare economics, market failure and microeconomics policy. Through the study of this course, students may master the most basic economic analysis methods, help students to make better personal decisions for themselves, understand the rules of the world in life, understand the advantages and disadvantages of government policies, and improve the ability of economic thinking.

8.5   Macroeconomics

This course is an important professional foundation course. Through the study of this course, students may master the basic theories and policies of macroeconomics comprehensively and systematically; understand the law of national economic operation, such as national income decision, economic growth, economic cycle, unemployment, inflation, etc; cultivate and improve their ability to correctly analyze macroeconomic phenomena and grasp economic operation. This course is helpful for students to understand the analysis and policy proposition of mainstream economics on economic problems, and lays a necessary theoretical foundation for students to study the follow-up economic courses and cultivate their macroeconomic thinking.

8.6 Political Economy

This course is an important professional foundation course. Political economy is an important part of Marxism, it is a summary for the experience of human economic practice, and it continuously develops in the new situation of economic relations. The main contents include: the general law of social-economic system and economic operation; the essence, law of movement and manifestation of capitalist production relations; and the historical process of socialist development under the condition of internationalization of industrial capital and deepening of capitalist world economic system. Through the study of this course, students may be able to correctly analyze various social and economic problems in the contemporary capitalist economic system and the primary stage of socialism, deepen their understanding of contemporary Marxism, and lay a solid theoretical foundation for the future courses.

8.7 Introduction to Statistics

This course is an important basic professional course, researching on how to measure, observe, summarize and express the quantitative features of objective phenomenon and to infer the overall quantitative features in accordance with the sampling data. Through this course, the students are required to understand the property, features and classification of statistics, understand the basic concept and basic thoughts of statistical description and master the basic methods of statistical description systematically, and know how to quantize and observe the features of phenomenon, research on how to infer the overall quantitative features in accordance with the sampling data and make inference of the unknown quantitative features of the statistics in the expression way of probability based on the description of sampling data.

8.8 Mathematical Statistics

This course is an important professional foundation course. Through the study of this course, students may master how to infer and predict the population according to the sample data on the basis of descriptive statistics. It mainly includes statistical magnitude and sample distribution, parameter estimation, hypothesis testing, categorical data analysis, variance analysis, statistical decision making, etc.

8.9 Econometrics

This course is an important professional foundation course. Econometrics is one of the core courses of economics. It reproduces the basic concepts, principles and methods of economic system through econometrics model, maintains the true relationship between various variables in economic system to the maximum extent, and analyzes objectively and accurately. The main contents include: econometric model and related parameter estimation, statistical test, econometric test, model identification, etc. Through the study of this course, students may understand the importance of econometrics in economics, which is helpful to enhance students' empirical ability of economics, expand and deepen the understanding of economics courses.

8.10 National Economic Statistics

The course contents include national economy classification, GDP accounting, return on investment accounting, capital flow accounting, asset and liability accounting, international income and expenditure accounting, national accounts, price statistics, national economic statistic

analysis and others. The students are required to master the theory and method of national economic accounting, understand the index system reflecting the basic quantitative relationship of national economy and research or analyze the macro economic problems with related indexes or statistical methods.

8.11 Applied Multivariate Statistic Analysis

The main contents include multivariate sampling distributions, judgment analysis, cluster analysis, factor analysis, principal component analysis, and the application of related software packages. Through the course, the students are required to master the multivariate statistic methods commonly used in economics and management and do calculation or analysis with related statistic software packages.

8.12 Applied Time Series Analysis

The main contents include the basic concept of time series analysis, stable time series model analysis, non-stable time series model analysis, seasonal time-series model analysis and others. Through the course, the students are able to master the theory and method of random time-series analysis commonly used in economics and management and does calculation or analysis with related statistic software.

8.13 Sampling Technology and Application

The course contents include the meaning and function of sampling investigation, general procedures of sampling investigation, sampling error and non-sampling error, pure random sampling, layering sampling, group sampling, multiphase sampling, and the application of sampling in practice. The students are required to master the sampling investigation methods or technologies in economics and management, understand the detailed application of sampling technology in practice.

9. Practical Training

This session include the learning and use of statistic software or mathematical software, mastering of basic statistical analysis methods. Please refer to the Timetable of Practical Session for detailed arrangement.

10. Course Category and Course Hours (excluding extracurricular classes)

Category	Total Credit	%	Total Course Hours	Theory Learning	Practical Training
General Education	34.5	23%	688	624	64
Basic Course	42	27%	672	624	48
Professional Course	34	23%	544	496	48
Practical Training	30.5	20%	880	0	880
General Course	10	7%	160	160	0
Total	151	100%	2944	1904	1040
Theory : Practice（%）	65 ： 35				

11. Teaching Schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
General Education	Required	School of Marxism	b1080001	Basic Theory of Marxism	test	3	48	42	6	Autumn 1
	Required	School of Marxism	b1080003	Moral Cultivation and Basic Legal Knowledge	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 the Thought of Mao Zedong and Theories of Socialism with Chinese Characteristics I	test	3	48	42	6	Autumn 2
	Required	School of Marxism	b1080007	Introduction to the Thought of Mao Zedong and Theories of Socialism with Chinese Characteristics II	test	2	32	28	4	Spring 2
	Required	School of Marxism	------	Situation and Policy (Module 1-4)	non-test	2	32	28	4	Autumn 1 - Spring 2
	Required	School of Marxism	b1080008	Labor Education A	non-test	0.5	16	16		Spring 1
	Required	College of Arts and Sciences	b1020018	College Chinese	non-test	2	32	32		Autumn 1
	Required	Department of Physical Education	------	PE I-VI	non-test	3	160	160		Autumn 1 - Autumn 4
	Required	Other	g1110003	Military Skills	non-test	0.5	2W			Autumn 1
	Required	College of Arts and Sciences	g1110002	Military Theories	non-test	0.5	32	32		Spring 1
	Required	Engineering Training Center	g1090001	Basic Engineering Training	non-test	2	32		32	Autumn 1
	* College English (Selective, 1 module required, 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 Extension	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 Extension	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
	* College German	College of Arts and Sciences	b1020040	General German I	test	3	48	48		Autumn 1
		College of Arts and Sciences	b1020041	General German II	test	3	48	48		Spring 1
		College of Arts and Sciences	b1020042	General German III	test	4	64	64		Autumn 2
	* College	College of Arts and Sciences	b1020077	General Japanese I	test	3	48	48		Autumn 1

Japanese	College of Arts and Sciences	b1020078	General Japanese II	test	3	48	48			Spring 1
	College of Arts and Sciences	b1020079	General Japanese III	test	4	64	64			Autumn 2
Sub-total (General Education)					**34.5**	**688**	**624**	**64**		
General Course	Selective	Other	b0----	Social Sciences and Humanities Literacy (4 credits) Natural Science and Technological Innovation (4 credits) Public Arts (2 credits)	non-test	10	160	160	0	Autumn, Spring
Sub-total (General Course)					**10**	**160**	**160**	**0**		

(*Notes: A total of 10 credits for the First Foreign Language, including College English, College German and College Japanese, students may choose one from the above-mentioned three foreign language according to their own needs; students, who choose College English as their First Foreign Language, shall select one module from Module A, Module B and Module C to learn.)

11. Teaching Schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Basic Course	Required	College of Arts and Sciences	b2022113	Calculus A	test	4	64	64		Autumn 1
	Required	College of Arts and Sciences	b2022025	Linear Algebra	test	4	64	64		Autumn 1
	Required	College of Arts and Sciences	b2022114	Microeconomics	test	3	48	48		Autumn 1
	Required	College of Arts and Sciences	b2022138	Foundation of Python	test	3	48	24	24	Spring 1
	Required	College of Arts and Sciences	b2022115	Calculus B	test	3	48	48		Spring 1
	Required	College of Arts and Sciences	b2022116	Foundation 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	College of Arts and Sciences	b2022118	Macroeconomics	test	3	48	48		Spring 1
	Required	College of Arts and Sciences	b2022011	Accounting Principles	test	2	32	32		Autumn 1
	Required	College of Arts and Sciences	b2022119	Political Economy	test	4	64	64		Autumn 2
	Required	College of Arts and Sciences	b2022120	Mathematical Statistics	test	3	48	40	8	Autumn 2
	Required	College of Arts and Sciences	b2022034	Finance	test	2	32	32		Autumn 2
	Required	College of Arts and Sciences	b2022121	Public Finance	test	2	32	32		Autumn 2
	Required	College of Arts and Sciences	b2022122	Econometrics	test	2	32	32		Spring 2
Sub-total (Basic Course)						42	672	624	48	
Professional Course	Required	College of Arts and Sciences	b2022112	Introduction to Economic Statistics	non-test	1	16	16		Autumn 1
	Required	College of Arts and Sciences	b2022029	Operational Research	test	2	32	32		Autumn 2
	Required	College of Arts and Sciences	b2022123	Applied Multivariate Statistic 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 Technology and Application	test	2	32	32		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	b2022127	National Economic Statistics	test	2	32	32		Autumn 3
	Required	College of Arts and Sciences	b2022006	Non-parametric Statistics	test	2	32	32		Autumn 3
	Required	College of Arts and Sciences	b2022128	Financial Statistics Analysis	test	2	32	32		Spring 3

Required	College of Arts and Sciences	b2022018	Data Mining	non-test	3	48	48		Spring 3
Required	College of Arts and Sciences	b2022129	Market Research and Forecasting	non-test	2	32	32		Spring 3
Required	College of Arts and Sciences	b2022130	Business Management Statistics	non-test	2	32	32		Autumn 4
Sub-total (Required Professional Course)					**28**	**448**	**400**	**48**	
* Selective (6 credits)	Module A	b2022131	Attribute Data Analysis	test	2	32	32		Autumn 3
		b2022007	Risk management	non-test	2	32	32		Autumn 4
		b2022137	Securities Investment Analysis						
		b2022043	Business Data Analysis and Application	non-test	2	32	32		Autumn 4
		b2022003	E-commerce Data Analysis						
	Module B	b2022132	Test Design and Analysis	test	2	32	32		Autumn 3
		b2022133	Reliability statistics	non-test	2	32	32		Autumn 4
		b2022134	Statistical analysis of quality management						
		b2022135	Statistical Calculations	non-test	2	32	32		Autumn 4
		b2022136	Machine Learning						
Sub-total (Selective Professional Course)					**6**	**96**	**96**		
Sub-total (Professional Course)					**34**	**544**	**496**	**48**	

11. Teaching Schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Practical Training	Required	College of Arts and Sciences	b4022014	Excel Data Processing and Analysis	non-test	3	72		72	Summer 1
	Required	College of Arts and Sciences	b4022047	SPSS Statistical Software	non-test	2	48		48	Summer 1
	Required	College of Arts and Sciences	b4022012	SQL Server Database Technology and Application	non-test	3	72		72	Summer 2
	Required	College of Arts and Sciences	b4022048	Basic R Language	non-test	2	48		48	Summer 2
	Required	College of Arts and Sciences	b4022049	Eviews Econometrics Software	non-test	2	48		48	Autumn 3
	Required	College of Arts and Sciences	b4022018	Comprehensive Practice of Social Surveys and Statistical Analysis	non-test	3	72		72	Spring 3
	Required	College of Arts and Sciences	b4022035	Innovation and Entrepreneurship of Economic Statistics	non-test	2	48		48	Spring 3
	Required	College of Arts and Sciences	b4022053	Python Language and Artificial Intelligence Application	non-test	3	72		72	Summer 3
	Required	College of Arts and Sciences	b4022051	Advanced R Language	non-test	2	48		48	Summer 3
	Required	College of Arts and Sciences	b4022052	Statistical Modeling Analysis and Writing	non-test	2	48		48	Autumn 4
	Required	College of Arts and Sciences	b4020002	Labor Education B	non-test	0.5	16		16	Spring 3
	Required	College of Arts and Sciences	b4022028	Graduation Internship and Graduation Design (Thesis) of Economic Statistics	non-test	6	288		288	Spring 4
Sub-total (Practical Training)						**30.5**	**880**		**880**	
Extracurricular Class	Required	Other	b5110001	Extracurricular Classes	non-test	1				Autumn, Spring, Summer
Total						**152**	**2944**	**1904**	**1040**	

*1. Guidance for the selective modules of professional course:

There are different modules for professional course to be selected according to different ability requirements, students must select one module to learn and achieve the credits required by the module.

Module A: Based on the ability of comprehensive basis, focus on the ability of financial economic statistics and business data analysis, give consideration to the ability of market research.

Module B: Based on the ability of comprehensive basis, focus on the ability of industrial economic statistics, give consideration to the ability of data analysis and market research.

2. Professional Certificates can be gained after learning following courses:

Upon the study of "Introduction to Statistics", "Mathematical Statistics", "National Economic Statistics", "Applied Multivariate Statistical Analysis", "Applied Regression Analysis", and "Applied Time Series Analysis" courses, students may take the examinations for the professional qualification certificates related to this project: Certificate of Junior Statistician;

Upon the study of "Political Economy", "Microeconomics", "Macroeconomics" and "Econometrics" courses, students may take the examinations for the professional qualification certificates related to this project: Certificate of Junior Economist.

12. Sequence of Courses Study

No.	Course Name	Prerequisite Course	No.	Course Name	Prerequisite Course
1	Calculus B	Calculus A	15	Financial Statistics Analysis	Finance Applied Time Series Analysis
2	Foundation of Probability Theory	Calculus A	16	Data Mining	Applied Multivariate Statistic Analysis
3	Introduction to Statistics	Foundation of Probability Theory	17	Market Research and Forecasting	Sampling Technology and Application
4	Macroeconomics	Microeconomics	18	Business Management Statistics	Mathematical Statistics
5	Finance	Macroeconomics	19	Attribute Data Analysis	Applied Multivariate Statistic Analysis
6	Public Finance	Macroeconomics	20	Risk Management	Financial Statistics Analysis
7	Econometrics	Mathematical Statistics Macroeconomics	21	Securities Investment Analysis	Finance Applied Time Series Analysis
8	Mathematical Statistics	Introduction to Statistics	22	Business Data Analysis and Application	Applied Multivariate Statistic Analysis Data Mining
9	National Economic Statistics	Introduction to Statistics	23	E-commerce Data Analysis	Applied Multivariate Statistic Analysis Data Mining
10	Applied Multivariate Statistic Analysis	Mathematical Statistics	24	Test Design and Analysis	Mathematical Statistics
11	Applied Regression Analysis	Mathematical Statistics	25	Reliability Statistics	Test Design and Analysis
12	Applied Time Series Analysis	Mathematical Statistics	26	Quality Management Statistics Methods	Test Design and Analysis
13	Non-parametric Statistics	Mathematical Statistics	27	Statistical Calculations	Applied Multivariate Statistic Analysis
14	Sampling Technology and Application	Mathematical Statistics	28	Machine Learning	Mathematical Statistics

13. Extracurricular Classes

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.