Plant Science and Technology

Major Code: 090104 Major Name: Plant Science and Technology

I. Objective System

1. Objectives

(1) General Objectives

This program aims to promote students physical and mental health and to advance their reasonable structures of knowledge; to develop decent personalities, refined humanistic feelings, and social responsibilities; to be critical-thinking and creative, to possess capabilities in science research, language skills, life-long study, and organizational management; and to have international visions and teamwork spirits.

(2) Specific Objectives

Students are trained to be high quality innovative individuals qualified for research, teaching and management of plant science and technology in modern agriculture and relevant fields. They are supposed to have good morality, humanistic pursuit and social responsibility, international perspectives and innovative ability, integrate modern bio-technology, info-technology with traditional agriculture, and master botanical genetic improvement, functional product R&D, and specialized production skills.

2. Basic Knowledge for Graduates Includes

(1) General Knowledge

A1. Arts and humanities, including history, philosophy, literature and art (to train students to understand different perspectives on history, the world, life, values, and aesthetics)

A2. Social science disciplines and their research methods (to equip students with basic research skills, a passion for humanistic pursuits, and an understanding of social responsibility)

A3. Mathematics, logic and physics (to train students to master basic knowledge in mathematics, logical analysis and college physics)

A4. Modern information technology (IT) (to enable students to use modern technologies relevant to the Internet, communications, and information processing)

A5. Ecological environmental studies, life sciences, and economic management (to provide students with a basic understanding of the natural world, economics, civilization, sociology, and more)

(2) Specific Knowledge

A6. Fundamental knowledge of chemistry (the basic knowledge in inorganic, analytical, organic, and plant chemistry)

A7. Fundamental knowledge of modern botany (the basic compositional units of plants, growth and development of tissues and organs, and classification methods based on phyto-groups)

A8. Fundamental knowledge of plant physiology (the basic knowledge of plant life cycle and the interactions with environments)

A9. Fundamental knowledge of biochemistry (the biosynthesis and metabolism of several primary molecules, such as sugar, lipid, protein and nucleic acid)

A10. Fundamental knowledge of genetics (the genetic and variation characteristics and laws of organismal phenotypes, the storage, transmission, and variation of genetic information, and other aspects of genetic materials)

A11. Fundamental knowledge of plant growth and development and the interactions with atmosphere, soil, microbes and other organisms (the basic knowledge of weather, microbes, soil, insects and the resulting interactions with plants)

A12. Fundamental knowledge of experimental methods and data processing (capabilities in basic experimental designs, data acquisition, principles and skills in data processing and utilization of computers)

A13. Knowledge of modern agronomy (the basic knowledge of the comprehensive agricultural sciences in the research and development, production, sales of produces)

A14. Knowledge of modern biotechnology (the basic knowledge in principles and methods of modern biotechnology and the connections with agronomy, agriculture advance and reform)

3. Graduate Requirements

(1) General Competencies

B1. To think clearly and express oneself well;

B2. To discover, analyze and solve problems;

B3. To think critically, innovate and pursue lifelong learning;

B4. To organize, manage, direct and cooperate;

B5. To appreciate literary and artistic works.

(2) Specific Competencies

B6. To track the frontiers of cutting-edge disciplines and seizing the hot areas of research;

B7. To conduct research and development of new plant products;

B8. To utilize modern biotechnology to improve agriculture;

B9. To provide extensions and services of agricultural technology;

B10. To administrate and manage agriculture-related businesses and products;

B11.To conduct international communications and cooperation.

4. Required Graduate Qualities

(1) General Qualities

C1. Be ambitious and strong-willed (To take the unshaken responsibilities of succeeding civilization, exploring truth, revitalizing the Chinese nation, and benefiting human beings)

C2. Be hard-working and progressive (To be practical, regardless of fame, diligent, and pursuing excellence)

C3. Stay physically and mentally healthy and have open visions (To have well physical and mental qualities; to have a multicultural and tolerant attitude and be open with international visions)

C4. Think nimbly and enjoy innovations (To be good in thinking, investigating, innovating, exploring and desiring to be creative)

(2) Specific Qualities

C5. Dedication to agriculture, serving for agricultural sciences and agricultural production ;

C6. Seeking truth from facts, following the laws of nature, and having good academic morality;

C7. Being keen to the discipline development trends and keeping in step with the current issues by continuous learning.

II. General Requirements

Graduates of this major are supposed:

1. To possess solid fundamental theories and scientific training, mastering principles, professional knowledge, and basic skills in plant science and technology; retaining factual and independent attitudes in science.

2. To be innovative to implement science research, resource investigation, new plant product development, and market exploration etc.

3. To familiarize with principles, policies and laws related with plant production, environment safety etc., and basic rules in plant product international trade so as to work with standardized protocols.

4. To master a foreign language, to be competent in using computer skills, to have basic capabilities in utilizing modern information technology to acquire knowledge and process data; to know the frontiers and application prospects of plant science and technology both domestically and internationally.

5. To possess profound humanistic spirit and good health.

III. Primary and Relevant subjects

Primary subject: Crop Science

Relevant subject: Biology

IV. Core Courses

Botany, Plant Physiology, Fundamental Biochemistry, Genetics, Experimental Design and Analysis,

Agroecology, Plant Resource, Plant Production, Plant Breeding, Genetic Engineering, and Agricultural Biotechnology, etc.

V. Hands-on Experience

With a total term of 46 weeks, hands-on experience includes military training, physical work, practice of ideological and political theory, engineering training, social practice, biology internship, research training practice, comprehensive practice in summer, teaching internship, thesis (design) etc.

VI. Credit Allocation

Course	Compulsory		Opt	ional	Hands-on Experience	Total	
	General	Specialized	General	Specialized	Experience		
Credits	59.5	22.5	6+x	49.5	36	173.5+x	
Minimum Credits	59.5	22.5	6	36	36	160	
%Percentage	37.1	14.1	3.8	22.5	22.5	100	

Note: Practice teaching includes hands-on experience and experimental teaching. The ratio of hands-on experience to the total credits of this major = (36+20)/160=35.0%.

VII. Duration of Study

Four years

VIII. Academic Degree

Bachelor of Agriculture

IX. Credit Requirements

Minimum credits for graduation: 160 Credits (curricular) +8 Credits (extracurricular) Curricular: 82 credits for compulsory courses, 42 for elective courses, and 36 for hands-on experience Extracurricular: 8 credits for Innovation, Entrepreneurship and Quality Development Total required for graduation: 168 credits

Course Type Cou					Course	rse Course length allocation Compu- y/Elec		Compulsor		Semeste r	Knowledge	Abilities	Qualities
		Course Code	Course Title	Credit	Length (Hours)			y/Elective	College				
	cience	1181001	Essentials of Modern & Contemporary History of China	1.5	24	24	Experiment		IIPE	2	A1A2	B2B3	C1C3
	olitical Sc	3181004	Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics	3.5	56	56		Compulsory	IIPE	6	A1A2	B2B3	C1C2
	nd Pc	1181002	Ideological and Moral Cultivation and Legal Essentials	2.5	40	40		12 Credits	IIPE	1	A1A2	В3	C1C2
	logy a	2181003	The Fundamental Principles of Marxism	2.5	40	40			IIPE	3	A1A2	B2B3	C1C3
	deo	2181005	Current Situation and Policy	2.0	8 time	s within 4	years		IIPE	1~8	A1A2	B2B3	C1C3
		1191001	College English I	3.0	64	32	32		DFL	1	A2A5	B1B11	C3C7
	lish	1191002	College English II	3.0	64	32	32	Compulsory 12 Credits	DFL	2	A2A5	B1B11	C3C7
dits	Eng	2191001	College English III	3.0	64	32	32		DFL	3	A2A5	B1B11	C3C7
cre		2191002	College English IV	3.0	64	32	32		DFL	4	A2A5	B1B11	C3C7
65.5		1241001	P.E. I	1.0	30	30			DPE	1	A2	В3	C3
(%6	9%) ical tion	1241002	P.E. II	1.0	30	30		Compulsory	DPE	2	A2	В3	C3
(40.5	Phys	2241001	P.E. III	1.0	30	30		4 Credits	DPE	3	A2	В3	C3
ses	E]	2241002	P.E. IV	1.0	30	30			DPE	4	A2	В3	C3
Cour		1151003	Advanced Mathematics (B)	5.5	88	88			CS	1	A3	B1B2	C4C6
ral (1151005	Linear Algebra	2.0	32	32			CS	2	A3	B1B2	C4C6
jene		1151007	Probability Theory	2.0	32	32			CS	2	A3	B1B2	C4C6
	S	2151107	College Physics (C)	3.0	48	48			CS	3	A3	B1B2	C4C6
	tura	2151108	College Physics Experiments (B)	1.0	32		32	Compulsory	CS	4	A3	B1B2	C4C6
	Na Sci	1151203	Inorganic and Analytical Chemistry	5.0	80	80		26 Credits	CS	1	A3	B1B2	C4C6
		1151205	Experiments of Inorganic and Analytical Chemistry	1.5	48		48		CS	2	A3	B1B2	C4C6
		1151201	Organic Chemistry	4.0	64	64			CS	2	A3	B1B2	C4C6
		2151202	Organic Chemistry Laboratory	2.0	64		64		CS	3	A3	B1B2	C4C6
	puter nce	1091002	Fundamentals of Computer Sciences (B)	2.5	48	32	16	Compulsory	CIE	1	A4	B2B3	C3C7
	Compi	1091003	VB Fundamentals of Programming (VB)	3.0	56	36	20	5.5 Credits	CIE	2	A4	B2B3	C3C7

Table 1 List of Courses for Plant Science and Technology

Course Type Course Co		Course Code	rse Code Course Title		Credit Length		Course length		Collogo	Semeste	Knowledge	Abilitios	Qualities
	urse rype	Course Coue	Course The	Creuit	(Hours)	Lecture	Experiment	y/Elective	College	r	Knowledge	Admines	Quanties
			Freshman Seminar	1.0				Elective	СА	1	A1A5	B3B6	C5
s lits	S		Technological Development and Civilization Heritage										
Jourse 5 cred	lective		Civilizations Communication and International Perspective					Elective					
al C	alE		Humanities and Life Values					5 credits					
Genei (40.9%)	Genera		Natural Environment and Social Development					for Public Art Courses)					
			Economic Management and Social Sciences										
dits	ine	1122101	Botany	3.0	48	48			CLS	1	A6	B6B7	C6C7
cre	cipl	1122102	Botany Experiment	1.0	32		32		CLS	1	A6	B6B7	C6C7
8.5	Dis	2122201	General Biochemistry	3.0	48	48			CLS	3	A8	B6B8	C6C7
%)5	%)5 	2122202	Basic Biochemistry Experiment	1.0	32		32		CLS	3	A8	B6B8	C6C7
9.9	Gene	2122103	Plant Physiology	3.0	48	48		Compulsory	CLS	4	A7	B6B8	C6C7
ss (3	ii.	2122104	Experiment on Plant Physiology	1.0	32		32	22.5 Credits	CLS	4	A7	B6B8	C6C7
urse	ses.	2012001	Genetics	3.5	64	48	16		CA	4	A10	B6B8	C6C7
C	Court Co	1152199	Agricultural and Forest Meteorology	2.5	48	32	16		CS	2	A11	B6B8	C6C7
ject	ic C	2012002	Agroecology	2.0	32	32		-	CA	3	A5	B6B8	C6C7
Sub	Bas	2122301	Microbiology	2.5	48	32	16		CLS	3	A11	B6B8	C6C7
		2013004	Experimental Design and Analysis	2.0	32	32			CA	4	A12	B7B9	C5C6
its		2013045	Plant Molecular Biology	2.0	32	32]	CA	4	A14	B8B9	C6C7
red	le	3013017	Plant Resource Science	2.0	32	32			CA	6	A7	B8B9	C6C7
3.5 c	iplir	3013060	Plant Tissue and Cell Culture	1.5	40	8	32		CA	5	A14	B6B8	C6C7
()58	Disci	3013041	Cell Biology	1.5	24	24			CA	5	A14	B6B8	C6C7
5.6%	ii. D	4013049	Plant Genomics and Proteomics	1.5	24	24		Flective	CA	7	A14	B6B8	C6C7
36	ses	3013044	Plant Development Biology	2.0	32	32		25 Credits	CA	5	A14	B8	C6C7
Ises	our	4013046	Plant Molecular Genetics	1.5	24	24			CA	7	A10	B8	C6C7
ct Cou	asic C	4013021	Commonly used Biotechnological Software	1.5	40	8	32		СА	7	A14	B8	C6C7
lbje	^m	3013047	Phytochemistry	1.5	32	20	12		CA	6	A6	B7B8	C6C7
Su		3013043	Plant Processing Technology	2.0	40	24	16		CA	5	A13	B7B9	C6C7
		3133002	Marketing	2.0	32	32			CEM	5	A13	B9B10	C6C7

Course Type Course Code		Course Code	Course Title	Credit	Course Length	Course length allocation Compulsor		College	Semeste	Knowledge	Abilities	Qualities	
	anse rype				(Hours)	Lecture	Experiment	y/Elective	Conege	r	Knowicuge	Tomues	Quantitos
	0	3013024	Computer Data Processing	2.0	40	24	16		CA	5	A12	B8	C6
	line	3013058	Seed Science	2.0	40	24	16		CA	5	A13	B9	C5C6
N.	iscip	2063707	Soil and Plant Nutrition	2.0	40	24	16		CNRE	6	A11	B8	C5C6
edi1	D	3033179	Introduction to Horticulture	2.0	32	32			СН	6	A13	B9	C5C6
5 ci	es i	3013038	Bioinformatics	1.5	28	20	8		CA	6	A14	B8	C6C7
)58.	sinc	3013037	Protected Farming	2.0	32	32			CA	5	A14	B8	C5C7
6%	Ŭ	3133013	Principles of Management	2.0	32	32			CEM	6	A14	B10	C5C7
(36.	Basic	3013062	Agricultural Information Technology	2.0	32	32			CA	5	A14	B8	C5C7
ses	Щ	3013050	Plant Stress Biology	2.0	32	32			CA	5	A11	B8	C5C7
our	ses	3014051	Plant Production Science	2.5	40	40			CA	6	A13	B7	C5C6
ct C	ours	3013071	Geoponics	2.0	32	32			CA	6	A13	B7	C5C6
ıbje	q C p	3014010	Plant Breeding	2.5	40	40		Elective	CA	6	A13	B7	C5C6
S.	alize	3013048	Plant Genetic Engineering	2.0	40	24	16	11 Credits	CA	6	A14	B7	C6C7
	Speci	3013068	Agricultural Biotechnology	2.0	40	24	16		СА	5	A14	B8	C6C7
		1305102	Military Training	1.0	2 weeks								
		1301001	National Defense Education	1.0									
dits		1305201	Physical Work		4 weeks								
cre		1305301	Social Practice Activities										
%)36	actice	1185007	Practice of Ideological and Political Theories	4.0	4 weeks				IIPE	2	A1	B4	C3
22.5	e P1	1085003	Engineering Training (C)	1.0	1 weeks				CMEE	1	A3	B2	C5
ence(2	lensiv	1125106	Biology Internship	1.0	1 weeks			Compulsory 36 Credits	CLS	2	A7 A11	B8	C6
aperi	mpreł	2015026	Research Training I	2.0	2 weeks				CA	3	A13 A14	B7B8	C4C5
s-on E	s-on E	2015027	Research Training II	2.0	2 weeks				CA	4	A13 A14	B7B8	C4C5
and		2015040	Comprehensive Practices in Summer	2.0	2 weeks				CA	4	A11 A13	B9	C5
H		3015025	Teaching Practice	12	12 weeks				CA	5,6	A13 A14	B7	C6
		4305001	Graduation Thesis (Design)	10	14 weeks				CA	7,8	A13 A14	B2	C6
	Innovati	on, Entrepreneurs	hip and Quality Development	8.0				Compulsory 8 credits		1~ 8			

	First Semester	0	Second Semester					
Course Code	Course Title	Credit	Course Code	Course Title	Credit			
1181002	Ideological and Moral Cultivation and Legal Essentials	2.5	1181001	Essentials of Modern & Contemporary History of China	1.5			
1191001	College English I	3.0	1191002	College English II	3.0			
1241001	P.E. I	1.0	1241002	P.E. II	1.0			
1151003	Advanced Mathematics (B)	5.5	1151005	Linear Algebra	2.0			
1151203	Inorganic and Analytical Chemistry	5.0	1151007	7 Probability Theory				
1122101	Botany	3.0	1091003	VB Fundamentals of Programming (VB)	3.0			
1122102	Botany Experiment	1.0	1151205	Experiments of Inorganic and Analytical Chemistry	1.5			
1191002	Fundamentals of Computer Sciences (B)	2.5	1151201	Organic Chemistry	4.0			
			1152199	Agricultural and Forest Meteorology	2.5			
Total	23.5 Credits (compulsory)		Total	Total20.5 Credits (compulsory)				
* 2 comp	Total credits for this semester is 28.5. * 2 credits for Elective General Courses. pulsory credits for Military Training (National Defense Educ * 1 credit for Engineering Training (C).	ation) .	Total credits for this semester is 25.5. * 4 credits for Practice of Ideological and Political Theories. * 4 credits (compulsory) for Biology Internship.					
	Third Semester		Fourth Semester					
Course Code	Course Title	Credit	Course Code	Course Title	Credit			
2181003	The Fundamental Principles of Marxism	2.5	2191002	College English IV	3.0			
2191001	College English III	3.0	2241004	P.E. IV	1.0			
2241003	P.E. III	1.0	2122103	Plant Physiology	3.0			
2151107	College Physics (C)	3.0	2122104	Experiment on Plant Physiology	1.0			
2151202	Organic Chemistry Laboratory	2.0	2012001	Genetics	3.5			

 Table 2 Guidance Teaching Plan for Plant Science and Technology

2122201	General Biochemistry	3.0	2151108	1.0				
2122202	Basic Biochemistry Experiment	1.0						
2122301	Microbiology	2.5						
2012002	Agroecology	2.0						
Total	20 Credits (compulsory)	1	Total	12.5 Credits (compulsory)				
				Total credits for this semester is 22.5.				
	Total credits for this semester is 24.			* 2 credits for Elective General Courses.				
	* 2 credits for Elective General Courses.			*2 credits for Research Training.				
	*2 credits for Research Training.		*2 credit	ts (compulsory) for Comprehensive Practices in summer vocat	tion.			
			* 4 credits courses are suggested from elective courses.					
	Fifth Semester		Sixth Semester					
Course Code	Course Title	Credit	Course Code	Course Title	Credit			
			2181004	Introduction to Mao Zedong Thought and Theoretical	2.5			
			3181004	System of Socialism with Chinese Characteristics	5.5			
Total	0 credit (compulsory)		Total 3.5 Credits (compulsory)					
	Total credits for this semester is 23.		Total credits for this semester is 26.5.					
*Teaching is to b	be arranged in the 5-6th semester with 12 credits (6 credits	this semester).	*Teaching is to be arranged in the 5-6th semester with 12 credits (6 credits this semester).					
	* 17 credits courses are suggested from elective courses.		* 17 credits courses are suggested from elective courses.					
	Seventh Semester			Eighth Semester				
Course Code	Course Title	Credit	Course Code	Course Title	Credit			
Total 0 credit (compulsory)			Total	0 credit (compulsory)				

Total credits for this semester is 8.	Traditionality for this summation is f
* 3 credits courses are suggested from elective courses.	Total credits for this semester is 5.
*Graduation thesis writing is to be arranged in the 7-8th semester with 10 credits (5 credits this	*Graduation thesis writing is to be arranged in the 7-8th semester with 10 credits (5 credits this
semester).	semester).