THAI NGUYEN UNIVERSITY OF AGRICULTURE AND FORESTRY
Quyet Thang Commune, Thai Nguyen City, Viet Nam
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Program name: Credit-based Undergraduate Program
Level of training: Undergraduate
Field of study: High-Tech Agriculture
Type of training: Full-time

1. Introduction:

This program is about automation systems in agricultural production (crops) with high technology application, including: Sensors and agricultural measurements such as temperature sensors, humidity, light, electrochemistry; Instruments and equipment to measure a number of external factors to the growth and development of plants such as humidity, temperature, light, pH,...; Some electrical equipment and tools used in automatic control systems include automatic/manual switchgear, time-maintaining devices, switches, power equipment, electric motors, and equipment. switchable, programmable controller; Automatic control systems in agriculture, such as automatic irrigation systems, automatic temperature control systems, lighting, automatic nutrient supplying systems, automatic equipment and systems in greenhouses; Remote control and monitoring systems for agricultural production.

2. Objectives

* General objectives

To educate agricultural engineers with good political qualities, professional ethics, initiative, creativity in learning, responsibility for work, ability to find jobs or start-up; Have extensive and extensive knowledge about the fields of crop science, information technology, automation, biotechnology, new materials technology to develop and apply advanced technologies to crop production, contributing to increasing production efficiency, creating products with high productivity, high quality, safety and competitiveness in the domestic and international markets.

* Specific objectives

- Development and application of technological processes in crop production; development of biologically applied products in agriculture.

- Operating and exploiting technological equipment systems used in the management and production of high-tech crops based on control techniques, information technology, communication and automation.

- Understanding of agricultural value chain, domestic and international agricultural products market; capable of managing and operating high-tech agricultural projects, production systems and agricultural quality.

3. Program outcomes

No	Output Standard/Graduation Documents	NL

		Level
1	Able to perform competently in the technical process of crop production.	3
2	Use of information technology and automation techniques in controlling the growth and development of crops to improve productivity and product quality.	3
3	Use of biotechnology and new materials technology in seed production and synthetic crop management to create safe products	3
4	Organizing production, business and trade promotion activities according to the value chain	3
5	Implementation of scientific research, training, training and technology transfer into production practice	3
6	Applying soft skills, using the media in crop management and production	3
7	Use English in your area of expertise	3

4. Total: 156 credits

(Excluding physical education and defense education)

5. Allocation of volumes of knowledge

content	Number of credits
BASIC KNOWLEDGE	**48**
1. Compulsory	39
2. Optional	9
3. Physical education (accumulated credits are not included)	3
4. Defense education (accumulated credits are not included)	165 details
ADDITIONAL KNOWLEDGE	**30**
1. Compulsory	15
2. Optional	15
PROFESSIONAL KNOWLEDGE	**78**
General professional knowledge	***24***
1. Compulsory	18
2. Optional	6
professional knowledge	***28***

1. Compulsory	19
2. Optional	9
experiments, internship, practice,	***11***
Graduation thesis	***10***
Professional practice (accumulated credits are not included)	***5***

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6. Contents of the training program

6.1. Content of the training program sorted by capacity (Output standard), capacity level and modul

ability	Modular	Credits	Section (Sc)	Credits		Modular	Credits	Section	Credits		Modular	Credits	Section	Credits	
				C	O				C	O				C	O
1. To perform competently the technical process of crop production.	**Level 1: Description of the aerican characteristics of the crop**					**Level 2: Determination of KT measures in accordance with the aerican characteristics of crops**					**Level 3: Application of technical processes in crop production**				
	MD1: Applied chemistry and biology in production and production1	**13**	**Sc1:** Biology	**3**		**MD10: Crop production technology**	**12**	**Sc30:** Vegetable and flower production technology	**4**		**MD20: professional practice - implementing high-tech crop production processes**	**8**	**Sc58:** professional practice 3_ Implement the process of high-tech vegetable production		8
			HP2: Plant Biomedy	**3**				**Sc31:** Fruit tree production technology	**3**				**Sc59:** professional practice 3_ Implement the process of high-tech flowers production		8
			HP3: Chemistry	**4**				**Sc32:** Tea Production Technology		3			**Sc60:** professional practice 3_ Implement the process of high-tech fruit trees production		8
			Sc4: Plant Biomedification	**3**				**Sc33:** Medicinal plant manufacturing technology		3			**Sc61:** professional practice 3_ Implement the process of high-tech tea tree production		8
								Sc34: R1_ Production technology of edible and medicinal	2		**MD21: Graduation Practice**	**10**	**Sc62:** professional practice _ scientific research project		10

								mushrooms							
								Sc35: Post-Harvest Technology	**3**				**Sc63:** professional practice _ Organization of crop production at the enterprise		10
						MD11: Post-harvest technology	**6**	**HP36:** professional practice 2_ Harvest, preliminary processing and preservation of agricultural products	**2**						
								HP37: R2_ Analysis and assessment of the quality of agricultural products	**1**						
2. Use of information technology and automation techniques in controlling plant STPT in order to improve NS	**Level 1: Understand the basic principles of information technology and automation techniques**					**Level 2: Application is modern techniques in controlling the growth and development of crops**					**Level 3: Design and operate the equipment system in CNC application crop production**				
	MD2: Basic principles in habitat control (temperature, humidity, water...) of plants	**8**	Sc5: Physics	**2**		**M12: Automatic control in crop production hi-tech applicati**	**6**	**Sc38:** Automatic system in high-tech crop production	**3**		**MD 22: Design, management and operation of agricultural equipment systems**	**3**	**Sc64:** Design, management and operation of agricultural equipment systems	**3**	

and SP quality			**Sc6:** General Information Technology	**3**		**on**		**Sc39:** Measurement techniques and sensors applied in agriculture	**3**		**MD21: Graduation Practice**		**Sc62:** professional practice - Implementation of scientific research topics		
			HP7: Principles of production of greenhouse crops		3	**MD 13: Crop management and control technology**	**6**	**HP40:** Applied Plant Biomedy	**3**				**HP63:** professional practice - Organization of plant production at enterprises		
			HP8: Agricultural Meteorology and Climate Change		3			**HP41:** Application of Fars exploration and GIS in agriculture		3					
								Sc42: Building an Agricultural Database		3					
3. Application of biotechnology and new material technology in seed production and integrated crop management in order to	**Level 1: Understand the basic knowledge in the application of biotechnology and new material technology in seed production and general management**					**Level 2: Selection of new seed and material production technology (input) in crop production and management.**					**Level 3: Application of high technology in the production of varieties and input materials**				
	MD3: Applied chemistry and biology in agriculture 2	**9**	**Sc9:** Choose to create a plant variety	**3**		**M14: Apply of biotechnology in seed production and plant protection**	**3**	**Sc43:** Biotechnology applied in plant breeding		3	**M23: New material manufacturing technology**	**4**	**Sc65:** Biological Products in Agriculture		3
			Sc10: Insects and Plant Diseases	3				**Sc44:** Diagnosis of allergies and plant quarantine;		3			**Sc66:** Nanotechnology in Agriculture		3

create safe products			**Sc11:** General Microorganisms		3								**Sc67:** R4_ Production of media and preparation of nutrient solutions	**1**	
			Sc12: Plant Genetics		3										
			Sc13: Molecular Biology		3										
	MD4: Land, water and crop nutrition management	**6**	**Sc14:** Plant prices and nutrition	**3**											
			Sc15: Land and water management for crops		3										
			Sc16: Organic Agriculture		3										
4. Organizing production, business and trade promotion activities according to the value chain	**Level 1: Understand basic knowledge in the application of biotechnology and new material technology to seed production and integrated quality management**					**Level 2: Develop and organize the implementation of plant production programs/projects according to the value chain.**					**Level 3: Advising and advising on policies in the field of CNC crop production**				
	M5: Analyzing trends in growing crop production by value bananas	**7**	HP17: Scientific Socialism	**2**		**MD15: Production Management**	**6**	**Sc45:** Building and Managing Projects	**3**		**MD24: Policy analysis in agricultural production**	**3**	**Sc68:** Analysis and impact assessment of agricultural policy		3
			Sc18: Political Economy	**2**				**Sc46:** Corporate Governance		3			**Sc69:** State and law		3
			Sc19: Starting a business		3			**Sc47:** Environmental pollution		3			**Sc70:** Rural Review		3
			Sc20: Vietnam's Economic Geography		3	**MD16: Product development and**	**7**	**Sc48:** Brands and Markets of Agricultural Products	**3**						

			Sc21: Vietnamese Culture		3	**market connection**		**Sc49:** Maketting No.		3					
								Sc50: Business Deals and Negotiations		3					
								Sc51: R3_ Building Agricultural Information Systems	**1**						
5.Implementation of scientific research, training, training and technology transfer into production practice	**Level 1: Understanding the basics of scientific research**					**Level 2: Training, technical training and technology transfer into production practice**					**Level 3: Organization of scientific research**				
	M6: Application of mathematics in research data processing	**5**	**Sc22:** Advanced Math	**2**		**MD17: Technology transfer method**	**6**	**Sc52:** Agricultural promotion and training of trainers	3		**M20: PP scientific research**	**3**	**Sc71:** Scientific research methods.	**3**	
			Sc23: Statistical Probability	**3**				**Sc53:** Seminar	3		**MD21: Graduation Practice**		**Sc62:** professional practice - Implementation of scientific research topics		
													Sc63: professional practice - Organization of plant production at enterprises		
6. Applying soft skills, using the media in crop management and production.	**Level 1: Understanding the basis of social science reasoning**					**Level 2: Use some media in propagating, promoting products and developing the market**					**Level 3: Application of soft skills in production practice**				
	MD7: Basis for social reasoning	**9**	**Sc24:** Marxist–Leninist philosophy	**3**		**M18: Communication Skills**	**3**	**Sc54:** Soft Skills		3	**MD20: professional practice 3- Implement the process**		**Sc58:** professional practice 3_ Implement the process of high-tech vegetable production		

			Sc25: Ho Chi Minh Thought	**2**				**Sc55:** Agricultural Application Programming		3	**of high-tech crop production**		**Sc59:** professional practice 3_ Implement the process of high-tech Flower Implementation		
			Sc26: History of the Communist Party of Vietnam	**2**				**Sc56:** Public Relations		3			**Sc60:** professional practice 3_ Implement the process of high-tech fruit trees production		
			Sc27: General Sociobiology	**2**									**Sc61:** professional practice 3_ Implement the process of high-tech tee tree production		
	Phone8: TTNN1	**1**	**Sc28:** Professional practice -Career orientation and visiting high-tech production model	**1**							**MD21: Graduation Practice**		**Sc62:** professional practice _Sciencetific research		
													Sc63: Professional practice _ Manufacturing Organization at the Enterprise		
7. Use English in your professional field	**Level 1: Meet standard A1**					**Level 2: Meet the A2 standard**					**Level 3: Meet B1 standard, read and understand specialized English documents**				
	Phone9: English 1	**3**	**Sc29:** English 1	**3**		**Phone19: English 2**	**3**	**Sc57:** English 2	**3**		**Phone25:** English 3	**3**	**Sc72:** English 3	**3**	
											MD26: Academic English	**3**	**Sc73:** Academic English	**3**	

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TC number synthesis	**61**		**49**	**30**		**58**		**40**	**39**		**37**		**13**	**67**
Total credits	**156**													
compulsory	**102**													
Optional	**136**													
Optional credits need to archive	**54**													

6.2. Contents of the training program sorted by knowledge block

No	Part Name	English name	credits	Theory	practice	Code
A. General education knowledge		**A. Basic science knowledge**	**48**			
I. Required lessons		**Compulsory courses**	**39**			
a) Political reasoning		***Political reasoning***	***11***			
1		Marxist-Leninist Philosophy	3	45	-	MLP131
2		Marxist-Leninist Political Ecomomy	2	30	-	MLE122
3		Science Socialism	2	30	-	SCS123
4		Ho Chi Minh's Ideology	2	30	-	HCM124
5		History of the Vietnamese Communist Party	2	30	-	HCP125
b) Foreign languages, information technology, natural sciences, society			***28***			
6		Chemistry	4	50	20	CHE141
7		Biology	3	40	10	BIO131
8		General Sociology	2	30	0	GSO121
9		Physics	2	30	0	PHY121
10		Advanced Mathematics	2	30	0	MAT121
11		English 1	3	45	0	ENG131
12		English 2	3	45	0	ENG132
13		English 3	3	45	0	ENG133
14		General Informatics	3	15	60	GIN131
15		Probability and Statistics	3	45	0	PST131
II. Optional classes (accumulate full 9 TC)			**9**			
16-18		General Microorganism	3	39	12	GMI131
		Soft skills	3	30	30	SSK431
		Academic English	3	45	0	
		Vietnam Economic Geography	3	30	0	VEG121
		State Law	3	30	0	SLA121
		Environmental Pollution	3	30	0	EPO121
		Molecular Biology	3	30	0	MBI121
		Scientific approach	3	30	0	SAM121

III. Physical Education*			**3**			
19		Physical Education	3			PHE111+ PHE112+ PHE113
		General exercises and athletics.	1			
		Volleyball	1			
		Badminton	1			
		Shuttlecock	1			
		Martial arts	1			
		Basketball	1			
		Soccer	1			
IV. Defense education*		**National defense education**				
B. Professional education knowledge			**108**			
I. Industry base knowledge			**24**			
1.1. Required lessons		Compulsory courses	***18***			
20		Plant physiology	3	37	16	PPH231
21		Plant biochemistry	3	29	32	PBI231
22		Plant breeding	3	35	20	PBR231
23		Introduction to plant insects and diseases	3	33	24	ITP231
24		Soil and Plant nutrition	3	34	22	SPN231
25		Applied plant physiology	3	30	30	APP231
1.2. Optional lessons (full accumulation of TC 6)			***6***			
26-27		Biotechnology application in plant breeding	3	30	30	BAC431
		Soil and water management	3	37	16	SWM221
		Agricultural meteorology	3	37	16	AME231
		Plant genetics	3	37	16	PGE231
		Organic agriculture	3	37	16	OAG231
		Pest diagnostics and quarantine	3	31	28	PDQ321
II. Industry knowledge			**28**			
2.1. Required lessons			***19***			
28		Vegetable, Flower production technology	4	45	30	VPT331

29		Fruit production technology	3	37	16	FPT331
30		Postharvest technology	3	37	16	PTE331
31		Agricultural Extention and Staff Training	3	30	30	AEST331
32		Seminars	3	8	74	SEM331
33		Scientific research methodology	3	31	28	SRM331
2.2. Optional lessons (accumulate 9 Credits)			***9***			
34 - 36		Principles of producing crop in Greenhouse	3	30	30	PGC331
		Tea production technology	3	30	30	TPT321
		Analysis and Evaluation of Agricultural Policy	3	30	30	AEAP321
		Herbal crops production technology	3	30	30	HCP321
		Rural Appraisal	3	30	30	RAP321
		Nanotechnology in Agriculture	3	45	0	NTE321
III. Complementary (interdisciplinary) knowledge			**30**			
3.1. Compulsory courses			***15***			
37		Automated systems in hi-tech crop production	3	41	8	ASH431
38		Measurement and sensor techniques	3	30	30	MST431
39		Project Management and Establishment	3	30	30	PME331
40		Branding and agricultural markets.	3	37	16	BAM431
41		Design, Management and Operation of Agricultural Device System	3	30	30	DMO431
3.2. Electives (15 credits cumulative			***15***			
		Startup and entrepreneurship	3	37	16	SAE421
		Sensing remote and	3	30	30	RSC431

		GIS application in Agriculture				
		Bioproducts in Agriculture	3	30	30	MTC431
		Corporate Governance	3	36	18	CGO231
		Digital marketing	3	30	30	DMA431
		Agricultural database building	3	30	30	DBA431
		Negotiating Business Transactions	3	30	30	NBT331
		Application programming in Agriculture	3	30	30	WAD431
		Public Relations	3	30	30	PRE431
IV. ***Internships***			**11**			
4.1. Required lessons			***3***			
47		Internship 1: Career orientation and study visits on hi-tech production models.	1	-	30	ICO511
48		Internship 2: Crop Harvest, Processing and Postharvest Techniques.	2	-	60	ICH521
3.2. Electives (8 credits cumulative)			***8***			
49		Internship 3: Implementing hi-tech production guidelines (Vegetable)	8	-	240	IHP581
		Internship 3: Implementing hi-tech production guidelines (Flower)	8		240	IHP 582
		Internship 3: Implementing hi-tech production guidelines (Fruit tree)	8		240	IHP 583
		Internship 3: Implementing hi-tech production guidelines (Tea)	8		240	IHP584
V. Graduate thesis			**10**	-		
50		Implementation of science research thesis	10		300	ISR610

		Crop production in the Enterprise	10		300	
VI. Professional practice			5			
R1		Mushroom and Medical Mushroom Production Technology	2	-	60	RMP721
R2		Agricultural product quality analysis and assessment.	1	-	30	RAP711
R3		Agricultural information system construction	1	-	30	RAQ711
R4		Production of growing substrates and nutrient solutions.	1	-	30	RPQ711
total		**Total**	**156**			

Students can choose their own subjects that are off the recommended list with the condition that support future career. Students should ask for further advice from the Advisory Department to make the right choice.

*** MoOC (Massive Open Online Cources) subjects**

In order to facilitate increased access to advanced training programs, Students can choose the recommended online courses in the following table to consider the equivalent of the subjects in the training program:

No	Subject code	Subject name	Credits	Subjects considered for MOOC equivalent (registration link)
	MAT121	Advanced Mathematics I	3	Lms.tnu.edu.vn
2.	GIN131	General Information Technology	3	Lms.tnu.edu.vn
3.	SLA121	General Law	2	Lms.tnu.edu.vn
4.	HCM124	Ho Chi Minh's Ideology	3	Lms.tnu.edu.vn
5.	MLP131	Marxist-Leninist Philosophy	4	Lms.tnu.edu.vn
6.	HCP125	Revolutionary line of the Communist Party of Vietnam	3	Lms.tnu.edu.vn
7.	CHE141	General chemistry	3	Lms.tnu.edu.vn
8.	PHY121	Physics 1	3	Lms.tnu.edu.vn
9.	MSC121	Academic Administration	3	Lms.tnu.edu.vn
10.	GSO121	General sociobiology	3	Lms.tnu.edu.vn

11.	EEC121	Environmental ecosystem	2	Lms.tnu.edu.vn
12.	BCN421	Agricultural extension methods	2	Lms.tnu.edu.vn
13.	MSR321	Methods of scientific research	3	Lms.tnu.edu.vn
14.	PST131	Statistical probability	3	Lms.tnu.edu.vn

8. Ethical plan

(E-commerce is arranged according to the period and matrix to meet the output standards of the investor)

No	Modular	Credits	Section	Credits		Matrix meets the output standards of E-commerce						
				C	O	1	2	3	4	5	6	7
	SEMESTER I			**17**								
1	MD7: Basis for social reasoning	**9**	**HP24:** Marxist–Leninist philosophy	3							1	
			HP25: Ho Chi Minh Thought	2							1	
			HP26: History of the Communist Party of Vietnam	2							1	
			HP27: General Sociobiology	2							1	
2	MD2: Basic principles in habitat control (temperature, humidity, water...) of plants	**8**	HP5: Physics	2			1					
			HP6: General Information Technology	3			1					
			HP7: Principles of production of greenhouse crops		3		1					
			HP8: Agricultural Meteorology and Climate Change		3		1					
	SEMESTER II			**19**								
3	M6: Application of mathematics in research data processing	**5**	**HP22:** Advanced Math	2						1		
			HP23: Statistical Probability	3						1		
4	MD1: Applied chemistry and biology in production and production1	**13**	**HP1:** Biology	3		1						
			HP2: Plant Biomedy	3		1						
			HP3: Chemistry	4		1						
			HP4: Plant Biomedification	3		1						
5	Phone8: TTNN1	**1**	**HP28:** TTNN1-Career orientation and visiting high-tech production model	1							1	

	TERM III			**19**								
6	M5: Analyzing trends in growing crop production by value bananas	**7**	HP17: Scientific Socialism	2					1			
			HP18: Political Economy	2					1			
			HP19: Starting a business		3				1			
			HP20: Vietnam's Economic Geography		3				1			
			HP21: Vietnamese Culture		3				1			
7	MD3: Applied chemistry and biology in NN 2	**9**	**HP9:** Choose to create a plant variety	3				1				
			HP10: Insects and General Tree Diseases	3				1				
			HP11: General Microorganisms		3			1				
			HP12: Plant Genetics		3			1				
			HP13: Molecular Biology		3			1				
8	Phone9: English 1	**3**	**HP29:** English 1	3								1
	TERM IV			**18**								
9	MD4: Land, water and crop nutrition management	**6**	**HP14:** Plant prices and nutrition	3				1				
			HP15: Land and water management for crops		3			1				
			HP16: Organic Agriculture		3			1				
10	MD18: Communication Skills	**3**	**HP54:** Soft Skills		3						2	
			HP55: Agricultural Application Programming		3						2	
			HP56: Public Relations		3						2	
11	M14: Application of biotechnology in seed production and crop protection	**3**	**HP43:** Biotechnology applied in plant breeding		3			2				
			HP44: Diagnosis of allergies and plant quarantine;		3			2				
12	M12: Automatic control in crop production CNC application	**6**	**HP38:** Automatic system in high-tech crop production	3			2					
			HP39: Measurement techniques and sensors applied in agriculture	3			2					

	SEMESTER V			**21**								
13	MD10: Crop production technology	**12**	**HP30:** Vegetable and flower production technology	4		2						
			HP31: Fruit tree production technology	3		2						
			HP32: Tea Production Technology		3	2						
			HP33: Medicinal plant manufacturing technology		3	2						
			HP34: R1_Công of edible mushrooms and medicinal mushrooms	2		2						
14	MD15: Production Management	**6**	**HP45:** Building and Managing Projects	3					2			
			HP46: Corporate Governance		3				2			
			HP47: Environmental pollution		3				2			
15	Phone19: English 2	**3**	**HP57:** English 2	3								2
	TERM 6			**18**								
16	MD 13: Crop management and control technology	**6**	**HP40:** Applied Plant Biomedy	3								
			HP41: Application of Fars exploration and GIS in agriculture		3		2					
			HP42: Building an Agricultural Database		3		2					
17	MD11: Post-harvest technology	**6**	**HP35:** Post-Harvest Technology	3		2						
			HP36: TTNN2_Thu, preliminary processing and preservation of agricultural products	2		2						
			HP37: R2_Phân analysis and quality assessment of agricultural products	1		2						
18	MD17: Technology transfer method	**6**	**HP52:** Agricultural promotion and training of trainers	3						2		
			HP53: Seminar	3						2		
	TERM 7			**15**								
19	MD16: Product development and market	**7**	**HP48:** Brands and Markets of Agricultural Products	3					2			

	connection		**HP49:** Maketting No.		3				2			
			HP50: Business Deals and Negotiations		3				2			
			HP51: R3_ Building Agricultural Information Systems	1					2			
20	MD20: TTNN3 - Implementation of CNC Crop QTSX	**8**	**HP58:** TTNN3_Thực implementing CNC vegetable production process		8		3					
			HP59: TTNN3_Thực implement cnc flower production process		8		3					
			HP60: TTNN3_Thực QTSX CNC Fruit Tree Implementation		8		3					
			HP61: TTNN3_Thực implementing CNC tea production process		8		3					
	TERM 8			**19**								
21	M25: PP scientific research	**3**	**HP71:** Scientific research methods.	3						3		
22	M23: New material manufacturing technology	**4**	**HP65:** Biological Products in Agriculture		3			3				
			PH66: Nanotechnology in Agriculture		3			3				
			HP67: R4_Sản of the body and the dispensing of nutrients	1				3				
23	MD 22: Design, management and operation of agricultural equipment systems	**3**	**HP64:** Design, management and operation of agricultural equipment systems	3			3					
24	MD24: Policy analysis in agricultural production	**3**	**HP68:** Analysis and impact assessment of agricultural policy		3				3			
			HP69: State and law		3				3			
			HP70: Rural Review		3				3			
25	Phone26: English 3	**3**	**HP72:** English 3	3								3

26	MD27: Academic English	**3**	**HP73:** Specialized English	3								3
	SEMESTER IX											
27	MD21: Graduation Practice	**10**	**HP62:** TTTN_Thực the subject of scientific research		10	3	3			3	3	
			HP63: TTTN_Tổ plant production organization at the enterprise		10	3	3			3	3	

No.	Subject	Credit number	Subject description
1	Growing media and plant nutrition	3	Credit number and periods: 3 credits (37 theory periods/16 practice periods/135 self-study periods) Pre-study subjects: Prerequisited subjects: : Basic microbiology Contents of the module: Introduction and production of some types of growing media, the role of nutrients in plant growth and development, the characteristics of some inorganic and organic fertilizers, and the determination of the balance of nutrients for plants.
2	Vegetable and flower production technology	3	Credit number and periods: 3 credits (45 theory periods/15 practice periods/135 self-study periods) Pre-study subjects: Principles of greenhouse crop production, Plant breeding, Biotechnology application in plant propagation, Growing media and plant nutrition, Basic pest and disease in crops Prerequisited subjects: : Plant physiology Parallel subjects: Flower production technology, Fruit tree production technology

			Contents of the module: There are two sub-modules: First sub-module: Vegetable production technology This module is divided into two parts: an introduction to the role and value of vegetables, production and market situation, and prospects for developing high-tech vegetable production in Vietnam and in the world; environmental requirements of vegetable crops, technology of soiless vegetable production. The specialized part is the major knowledge of high-tech application farming techniques for some popular vegetable crops: lettuce, tomato, cucumber in order to produce high quality, high yield and safe products based on VietGAP; improving product value to meet the needs of the market Second sub-module: Flower production technology The second module consists of two parts, the general part: an introduction to the production situation and development prospects of the flower production industry; the main factors affecting the growth and development of flowering plants; multiplication techniques of flower. The second part specializes in: Techniques for producing some popular flower plants with high technology application, including lily, gerbera, and Ho Diep orchids.
3	Fruit tree production technology	3	Credit number and periods: 3 credits (37 theory periods/8 practice periods/135 self-study periods) Pre-study subjects: General profesional knowledge subjects Prerequisited subjects: : Contents of the module: The module on fruit tree production technology includes the following contents: Introduction to the role, production, consumption and development

			potential of fruit trees; Research on the main agro-biological characteristics and ecological requirements of fruit tree varieties; Researching and applying advanced and high-tech farming techniques to the production of some popular fruit trees in the Northern region: citrus fruit trees, litchi, longan, mango, pineapple and banana in order to produce products that meet market needs.
4	Automation in crop production	3	Credit number and periods: 3 credits (41 theory periods/8 practice periods/135 self-study periods) Pre-study subjects: Prerequisited subjects: : Physics, Advanced mathematics Contents of the module: The module content is about automation systems in agricultural production (crops) with high technology application, including: Sensors and agricultural measurements such as temperature sensors, humidity, light, electrochemistry; Instruments and equipment to measure a number of external factors to the growth and development of plants such as humidity, temperature, light, pH,...; Some electrical equipment and tools used in automatic control systems include automatic/manual switchgear, time-maintaining devices, switches, power equipment, electric motors, and equipment. switchable, programmable controller; Automatic control systems in agriculture, such as automatic irrigation systems, automatic temperature control systems, lighting, automatic nutrient supplying systems, automatic equipment and systems in greenhouses; Remote control and monitoring systems for agricultural production.
5	Principles of greenhouse crop production	3	Credit number and periods: 3 credits (30 theory periods/30 practice periods/135 self-study periods) Pre-study subjects: Prerequisited subjects: : Plant Physiology, Growing

			media and plant nutrition Contents of the module: The module introduces about general introduction of greenhouses, greenhouse structures and ancillary materials; environmental control equipments, water and nutrition, pest control, farming greenhouse types, mechanization and hydroponic vegetable production techniques in greenhouse, net house.