

PROGRAM SPECIFICATION OF DOCTOR OF PHILOSOPHY

Program: Genetics and Plant Breeding

Code: 9 62 01 11

Type of program: Continued/ discontinued program

(No. 4234/QĐ-HVN 29 December 2016 from Rector of Vietnam National of Agriculture)

1. Objectives and expected learning outcomes

1.1. Objectives

1.1.1. General Objectives

To provide learners with advanced knowledge in plant genetics and breeding including: molecular genetics, genetical tools applied in breeding, breeding methods aimed to targeted characteristics such as tolerance to pests and resistance to disease, breeding for quality, genetics and breeding for hybrid varieties.

1.1.2. Specified Objectives

Learners have the capacity and skills to set up, implement and be leader in research related to developing genetic materials and plant breeding.

Scientist have the professional expertise, be objective and well- organized, have cooperation in research and transfer.

1.2. Expected learning outcomes

1.2.1. Knowledge

- Review, apply advanced and comprehensive knowledge in accessing and solving issues in the professional field.
- Be proficient in research methods involved in genetics and plant breeding;
- Apply the basic professional knowledge to analyze and evaluate the current situation, from which to set up scientific hypothesis, research ideas and research implementation. Sumirize and analyze the results of the research to find out new things useful for scientic and practica.
- Apply knowledge of law, management and implematation, environmental protection in the field of breeding, seed production and development of varieties of high quality in accordance with Vietnamese standards.

1.2.2. Skills

- Proficiency in professional skills related to plant genetics and breeding
 - Identifying and analyzing complex issues and provide innovative solutions to solve problems in the professional field;
 - Contribute new knowledge to the development of the principles and theory in genetics and plant breeding and cultivation;
 - Search documents, summarize professional knowledge and set up cooperative relationships with scientists, research institutions at home and abroad in plant genetics and breeding and crop cultivation.
- + English language requirements
- English proficiency of B2 follows the European Common Framework of Reference or equivalent
 - summarize and explain the content of the report, present the topic related to the plant

genetics and breeding; To write scientific reports, specialized reports related to crop sciences and plant genetics and breeding; Good communication, clear feedback, defense and review issues in the field of plant genetics and breeding and cultivation.

+ Information technology

- Be proficient in computer science related to professional field

1.2.3. *Autonomy and responsibility*

- Identify and propose innovative and valuable solutions in the field of plant genetics and breeding;
- Sumarize and analyze the current status and trends in the field of plant genetics and breeding, in plant production in the world and in Vietnam.
- Be active in research, defense and review. Work independently, teamwork and team management
- Be able to make decisions on work plans, management of research activities, develop new knowledge, ideas and processes involved in plant genetics and breeding.

2. Period of study

- The duration of training for those who hold a master's degree is 03 years, for those who do not have a master's degree of 04 years.

3. Fully knowledge blocks

TT	Knowledge Blocks	Credits
1	Compulsory generic knowledge	6
2	Elective knowledge	8
3	Literature review	2
4	Thematic	4
5	Dissertation	70
	Total	90

- When PhD students do not have a master's degree, they must study additional 30 credits in the Master's Degree Program in Plant Genetics and Breeding, besides the Philosophy and English
- For PhD students who hold master's degrees in closed or in the same discipline but have graduated for many years or from other training institutions, depending on each situation, PhD students must take additionally courses as required by the training and research.

4. PhD candidates

According to the current regulations of the Ministry of Education and Training and the Vietnam Agriculture Academy on doctoral training

4.1. Suitable Major

Plant Genetics and Breeding , Cultivation; Crop Science, Agronomy

4.2. Closed Major

Plant Protection, Biotechnology, Biology, Bachelor of Agriculture, Vegetables - Flowers
- Fruit Crops

5. Planning study, PhD qualification

According to the current regulations of the Ministry of Education and Training and the Vietnam Agriculture Academy on doctoral training.

6. Scales

Assessment on a scale of 10

7. Content of program

	Code	Course name in Vietnamese	Course name in English	Credits	Theory	Practical	compulsory	Elective
Doctoral moduls								
1	NH0811	Di truyền phát triển và Kiểm soát các tiềm năng thích ứng ở cây trồng	Developmental genetics and control of adaptive potentials in crop plants	3			x	
2	NH0812	Phát triển công cụ di truyền trong chọn giống cây trồng	Development of genetic tools in plant breeding	3			x	
3	NH0813	Quản lý và khai thác nguồn gen thực vật phục vụ chọn giống cây trồng	Management and utilization of plant germplasm for breeding	2				x
4	NH0814	Cơ sở di truyền và chọn giống kháng sâu, bệnh	Genetics and breeding crops for resistance to insect pests and diseases	2				x
5	NH0815	Cơ sở di truyền và chọn giống chống chịu các điều kiện bất thuận	Genetics and breeding crops for tolerance to abiotic stresses	2				x
6	NH0816	Quản lý chương trình tạo giống cây trồng	Management of plant breeding programs	2				x
7	NH0817	Di truyền và chọn giống cây trồng chất lượng cao	Genetics and breeding crops for high quality	2				x
8	NH0818	Di truyền chọn giống cây trồng năng suất cao	Genetics and breeding crops for high yield	2				x
9	NH0821	Công nghệ cao trong trồng trọt	High technology in plant cultivation	2				x
10	NH0804	Những tiến bộ mới trong quản lý	Advances in Plant Disease	2				x

	Code	Course name in Vietnamese	Course name in English	Credits	Theory	Practical	compulsory	Elective
		bệnh hại	Management					
Literature review (LR) and thematic (T)								
11	LR	Tiểu luận tổng quan		2			x	
1	T	Cơ sở di truyền và chọn giống cây trồng ưu thế lai	Genetics and breeding for heterosis	2				x
2	T	Di truyền hệ thống bất thụ, bất dục đực và ứng dụng trong công nghệ sản xuất hạt lai F ₁ .	Application of self-incompatibility and male sterility in F ₁ hybrid seed production	2				x
3	T	Di truyền tự bất hợp (SI), đơn tính cái (Gy) ứng dụng trong công nghệ sản xuất hạt lai F ₁	Application of self-incompatibility and gynoecey in F ₁ hybrid seed production	2				x
4	T	Đa dạng di truyền và khai thác nguồn gen thực vật hoang dại	Genetic diversity and utilization of wild plant germplasm	2				x
5	T	Chọn lọc tế bào và sử dụng các biến dị dòng xoma ở cây trồng.	Cell selection and utilization of somaclonal variations in crop breeding	2				x
6	T	Kỹ thuật biến nạp di truyền và thành tựu chọn tạo giống cây trồng.	Genetic transformation and achievements in crop breeding	2				x
7	CD	Đột biến tạo giống cây trồng năng suất, chất lượng và kháng bệnh	Plant mutation breeding for yield, quality and disease resistance	2				x
8	T	Di truyền và chọn giống cây lương thực chất lượng	Genetics and breeding for high quality	2				x

	Code	Course name in Vietnamese	Course name in English	Credits	Theory	Practical	compulsory	Elective
		cao	food crops					
9	T	Di truyền và chọn giống cây rau chất lượng cao	Genetics and breeding for high quality vegetables	2				x
10	T	Di truyền và chọn giống cây công nghiệp chất lượng	Genetics and breeding industrial crops for high quality	2				x
11	T	Di truyền chọn giống kháng bệnh do tác nhân nấm gây hại	Genetics and breeding crops for resistance to fungal diseases	2				x
12	T	Di truyền chọn giống cây trồng kháng bệnh vi khuẩn	Genetics and breeding crops for resistance to bacterial diseases	2				x
13	T	Di truyền và chọn giống cây trồng kháng bệnh virus	Genetics and breeding crops for resistance to viral diseases	2				x
14	T	Di truyền và chọn giống cây trồng kháng sâu	Genetics and breeding crops for resistance to insects	2				x
15	T	Di truyền và chọn giống cây trồng chịu hạn nhờ marker phân tử	Genetics and breeding for drought tolerance by MAS	2				x
16	T	Di truyền và chọn giống cây trồng chịu mặn nhờ marker phân tử	Genetics and breeding for salt tolerance by MAS	2				x
17	T	Di truyền và chọn giống cây trồng chịu ngập úng nhờ marker phân tử	Genetics and breeding for submergence tolerance by MAS	2				x
18	T	Di truyền và chọn giống cây trồng	Genetics and breeding for	2				x

	Code	Course name in Vietnamese	Course name in English	Credits	Theory	Practical	compulsory	Elective
		chịu nhiệt độ bất thuận	tolerance to adverse temperatures by MAS					
19	T	Sử dụng lai xa trong khai thác tính trạng mục tiêu đặc biệt	Interspecific hybridization for target traits	2				x
20	T	Ứng dụng vô phối trong chọn giống và nhân giống cây trồng	Application of apomixis in plant breeding and seed production	2				x
			Dissertation	70			x	

8. Study plan

Sem.	Order	Course name in Vietnamese	Course name in English	Code	No. credits	Theory	Practical	C/E
1-6.	1	Di truyền phát triển và Kiểm soát các tiềm năng thích ứng ở cây trồng	Developmental genetics and control of adaptive potentials in crop plants	NH0811	3			C
1-6.	2	Phát triển công cụ di truyền trong chọn giống cây trồng	Development of genetic tools in plant breeding	NH0812	3			C
8	3	Luận án tiến sĩ	Dissertation		70			C
1-6.	4	Quản lý và khai thác nguồn gen thực vật phục vụ chọn giống cây trồng	Management and utilization of plant germplasm for breeding	NH0813	2			E
1-6.	5	Cơ sở di truyền và chọn giống kháng sâu, bệnh	Genetics and breeding crops for resistance to insect pests and diseases	NH0814	2			E
1-6.	6	Cơ sở di truyền và chọn giống chống chịu các điều kiện bất thuận	Genetics and breeding crops for tolerance to abiotic stresses	NH0815	2			E
1-6.	7	Quản lý chương trình tạo giống cây trồng	Management of plant breeding programs	NH0816	2			E
1-6.	8	Di truyền và chọn giống cây trồng chất lượng cao	Genetics and breeding crops for high quality	NH0817	2			E

1-6.	9	Di truyền chọn giống cây trồng năng suất cao	Genetics and breeding crops for high yield	NH0818	2			E
1-6.	10	Công nghệ cao trong trồng trọt	High technology in plant cultivation	NH0821	2			E
1-6.	11	Những tiến bộ mới trong quản lý bệnh hại	Advances in Plant Disease Management	NH0804	2			E
	Tiểu luận tổng quan (2 tín chỉ)				2			C
4-7.	1	Cơ sở di truyền và chọn giống cây trồng ưu thế lai	Genetics and breeding for heterosis		2			E
4-7.	2	Di truyền hệ thống bất thụ, bất dục đực và ứng dụng trong công nghệ sản xuất hạt lai F1.	Application of self-incompatibility and male sterility in F ₁ hybrid seed production		2			E
4-7.	3	Di truyền tự bất hợp (SI), đơn tính cái (Gy) ứng dụng trong công nghệ sản xuất hạt lai F1	Application of self-incompatibility and gynoecey in F ₁ hybrid seed production		2			E
4-7.	4	Đa dạng di truyền và khai thác nguồn gen thực vật hoang dại	Genetic diversity and utilization of wild plant gerplasm		2			E
4-7.	5	Chọn lọc tế bào và sử dụng các biến dị dòng xoma ở cây trồng.	Cell selection and utilization of somaclonal variations in crop breeding		2			E
4-7.	6	Kỹ thuật biến nạp di truyền và thành tựu chọn tạo giống cây trồng.	Genetic transformation and achievements in crop breeding		2			E
4-7.	7	Đột biến tạo giống cây trồng năng suất, chất lượng và kháng bệnh	Plant mutation breeding for yield, quality and disease resistance		2			E
4-7.	8	Di truyền và chọn giống cây lương thực chất lượng cao	Genetics and breeding for high quality food crops		2			E
4-7.	9	Di truyền và chọn giống cây rau chất lượng cao	Genetics and breeding for high quality vegetables		2			E
4-7.	10	Di truyền và chọn giống cây công nghiệp chất lượng	Genetics and breeding industrial crops for high quality		2			E
4-7.	11	Di truyền chọn giống kháng bệnh do tác	Genetics and breeding crops for		2			E

		nhân nấm gây hại	resistance to fungal diseases					
4-7.	12	Di truyền chọn giống cây trồng kháng bệnh vi khuẩn	Genetics and breeding crops for resistance to bacterial diseases		2			E
4-7.	13	Di truyền và chọn giống cây trồng kháng bệnh virut	Genetics and breeding crops for resistance to viral diseases		2			E
4-7.	14	Di truyền và chọn giống cây trồng kháng sâu	Genetics and breeding crops for resistance to insects		2			E
4-7.	15	Di truyền và chọn giống cây trồng chịu hạn nhờ marker phân tử	Genetics and breeding for drought tolerance by MAS		2			E
4-7.	16	Di truyền và chọn giống cây trồng chịu mặn nhờ marker phân tử	Genetics and breeding for salt tolerance by MAS		2			E
4-7.	17	Di truyền và chọn giống cây trồng chịu ngập úng nhờ marker phân tử	Genetics and breeding for submergence tolerance by MAS		2			E
4-7.	18	Di truyền và chọn giống cây trồng chịu nhiệt độ bất thuận	Genetics and breeding for tolerance to adverse temperatures by MAS		2			E
4-7.	19	Sử dụng lai xa trong khai thác tính trạng mục tiêu đặc biệt	Interspecific hybridization for target traits		2			E
4-7.	20	Ứng dụng vô phôi trong chọn giống và nhân giống cây trồng	Application of apomixis in plant breeding and seed production		2			E

9. Summary of Contents

9.1. Describe of subjects

NH0804. Advances in Plant Disease Management (2: 2-0-4)

Strategies to prevent viral disease; New achievements against some important viral diseases; Strategies for fighting fungal diseases; New achievements against some important fungal diseases; Strategies for preventing bacterial diseases; New achievements against some important bacterial diseases.

NH0811. Developmental genetics and control of adaptive potentials in crop plants. (3: 3 – 0 – 6)

The self-control of the genome. Individual and genetic controls of plant development. Discussion 1: Self-control of the genetic genome, genetic control of the development of plants. Adaptive systems. Discussion 2: Genetic control of adaptive systems, genetic structure of populations and adaptive breeding.

NH0812. Development of genetic tools in plant breeding (3: 3 – 0 - 6)

Traditional genetic tools improve and enhance. New tools in plant breeding. Analysis of phenotype of large amount. Genetic analysis of large numbers. Genetic transducer.

NH0813. Management and utilization of plant germplasm for breeding (2: 1,5 – 0,5 - 4)

New knowledge of in-situ conservation. Evaluate genetic resources based on phenotypes and molecular markers. Exploitation of genetic resources in plant breeding. Identify the gene source that carries the target gene. Improve genetic resources by hybridizing with gene pools. Improve genetic resources by crossing and transplanting genes.

NH0814. Genetics and breeding crops for resistance to insect pests and diseases (2: 2,0-0,0-4,0)

Introduce genetic inheritance disease resistance and select disease resistant varieties. Host and insect interaction. Structure and organization of resistance genes. Populations that cause disease, fluctuations and inheritance toxicity. Molecular cytology, molecular genetics and specificity of host-parasite interactions. Molecular mechanisms of signal transmission and expression of resistance; The function of the pathogenic proteins. Molecular mechanisms of signal transmission and expression of resistance; The function of the pathogenic proteins. Molecular indicator; The strategy uses natural resistance and biotechnology. Participants will present the topics covered.

NH0815. Genetics and breeding crops for tolerance to abiotic stresses (2: 1,5- 0,5 - 4,0)

Uncertain environment, concept and classification. Genetic and environmental interaction. Genetic resists tolerance. Select varieties of rice, corn, soybeans resistant to drought conditions. Select varieties of rice, maize, tomatoes to resist salinity and flood. Choose varieties of tomatoes and hot beans.

NH0816. Management of plant breeding programs (2: 2 – 0 – 4)

Fundamentals of Management and Strategy; Breeding program in the general strategy of the research / breeding facility (breeding program of yield, quality, tolerance ...). Building vision and goals; program evaluation. Identify key strategies and necessary competencies (human resources). Management of seed selection, data management / selection books (some major crops). Planning and budget management. Resource management within the organization's objectives (seed selection). Intellectual property and contractual matters, agreements. Application conflict resolution to handle bad situations. Leadership and management skills to achieve common goals. Coping with change; Promote innovation / creativity in the organization.

NH0817. Genetics and breeding crops for high quality (2: 1,5- 0,5 - 4)

To inherit high quality traits in plants. Select high quality of food crops, vegetables and industrial plants.

NH0818. Genetics and breeding crops for high yield (2: 1,5- 0,5 - 4)

Physiology of high productivity crops. Heritability of yield and productivity factor. Model of high productivity crop. Method of breeding some high yielding crops (Rice, maize, sugarcane and tomato varieties)

9.2. Review essays

a) Regulations

The essay overview, equivalent to 2 credits, was presented by PhD. student about the research situation and issues related to the thesis topic. PhD. students have the ability to analyze and evaluate the existing works of authors at home and abroad on matters closely related to these topics, pointing out the problems still exist. The thesis should focus on studying and solving. The essay should not exceed 15 A4 pages, 1.5 lines away; PowerPoint presentations should not exceed 20 minutes.

b) Evaluation of essay (Assessment on a scale of 10 points)

- Contents: 5 points
- Presentation: 2 points
- Answer the question: 3 points

9.3. Thematic

a) Regulations

The thematic of doctoral degree require the PhD student to update his / her own knowledge directly related to the subject of the doctoral student, to increase the capacity of scientific research, to assist the researcher in solving some contents of the topic.

PhD students should write own thematic (no more than 15 A4 pages, 1.5 lines apart) and present in PowerPoint (no more than 20 minutes) to the Review Board.

b) Evaluation of Thematic (Assessment on a scale of 10 points)

- Contents: 5 points
- Presentation: 2 points
- Answer the question: 3 points

c) Describe of thematic

1. Genetics and breeding for heterosis

Concepts of group hybrid varieties. Genetic basis of heterosis (models of gene interaction and genome analysis). Possibilities for combining and estimating hybrid expressions. Breeding hybrids in accordance with the directions set out in the plants.

2. Application of self-incompatibility and male sterility in F₁ hybrid seed production

Genetic control of inbred lines and their applicability in hybrid selection. Genetic control of male sterility systems by genes and cytoplasm. Generate male sterile lines by genes that control sensitivity to environmental factors (double-stranded system). Create cytoplasmic and maintenance lines (lines A and B in three-line system). Improve the efficiency of hybrid seed production using male sterile parent lines.

3. Application of self-incompatibility and gynocoe in F₁ hybrid seed production

Incompatibilities and genetic controls. Methods of creating Incompatibility lines. Selection and multiplication of Incompatibility lines in hybrid seed production. Gynocious , genetic control and the influence of extraneous factors. Maintain Gynociou lines and use them in hybrid seed production in plant species.

4. Genetic diversity and utilization of wild plant gerplasm

Species, sub - species and their valuable characteristics - target for exploitation. Genetic diversity in cultivars - indigenous genetic resources, adaptive gene sources, ... values for use in breeding purposes. Evaluate, identify traits in the corporation by morphology, biochemistry and molecular indicator. Evaluate the genetic distance of the material source.

5. Cell selection and utilization of somaclonal variations in crop breeding

Causes and mechanisms of somatic cell line mutations in common culture systems. Methods of making mutations in the in vitro system. Cellular selection methods in vitro. Evaluate, isolate variants in regenerated tree populations and their applicability.

6. Application of apomixis in plant breeding and seed production

Haploids (H), double haploids (DH) - a valuable tool in genetic research and breeding. Methods for generating H / DH lines through spontaneous reproduction. Haplotype and ability to apply. Sporulation of D / DH seedlings and their applicability.

7. Genetic transformation and achievements in crop breeding

Vectors in gene transfer. Cultivating systems - regenerating plants and improving the efficiency of transplantation methods. Income and methods of evaluating transgenic plants. Some achievements and applicability for breeding under the target.

8. Plant mutation breeding for yield, quality and disease resistance

Physical, chemical agents cause mutations effectively. Improve the efficiency of treatments that cause mutations in plants. The mutant breeding methods in clonal propagation and in self-pollinating group, some achievements and the possibility of development.

9. Interspecific hybridization for target traits

Cultivars in the system of species, neighboring subspecies and their valuable characteristics to exploit. Methods to improve the efficiency of fertilization and embryo maturation, the offspring. Methods of increasing the efficiency of receiving desired recombinants. Receive incoming gene input line through hybrid return.

10. Genetics and breeding for high quality food crops

Evaluation of traits related to morphological quality, food quality, quality of biochemistry - nutrition in plants. Genetic control studies, genetic / QTL linkage tests for quality related traits. Methods of selection for traditional and modern quality and some achievements in plant species.

11. Genetics and breeding for high quality vegetables

Evaluation of traits related to morphological quality, food quality (tasting), biochemical quality - nutrition in plant species. Genetic control studies, genetic / QTL linkage tests for quality related traits. Methods of selection of traditional and modern quality and some achievements in vegetable plants.

12. Genetics and breeding industrial crops for high quality

Evaluation of traits related to morphological quality, food quality (tasting), biochemical quality - nutrition in plant species, some characteristics related to specialty quality. Genetic control studies, genetic / QTL linkage tests for quality related traits. Methods of selection of traditional and modern quality and some achievements in industrial plants

13. Genetics and breeding crops for resistance to fungal diseases

Characteristics of genetic variation of the pathogen (strains, isolates). Genetic control of disease resistance (qualitative, quantitative) in plants. Genetically engineered markers / QTLs control fungal resistance in plants. The traditional and modern method of breeding fungal resistance, some of the achievements in the plant.

14. Genetics and breeding crops for resistance to bacterial diseases

Characteristics of genetic variation of the pathogen (strains, isolates). Genetic control of disease resistance (qualitative, quantitative) in plants. The genetic linker / QTL markers control bacterial resistance in plants. Methods of breeding bacteria resistant to traditional and modern, some achievements in the plant.

15. Genetics and breeding crops for resistance to viral diseases

Characteristics of genetic variation of the pathogen (strains, isolates). Genetic control of disease resistance (qualitative, quantitative) in plants. Genetically engineered markers / QTLs control viral disease resistance in plants. The traditional and modern method of breeding virus resistance, some achievements in plant species.

16. Genetics and breeding crops for resistance to insects

Evaluate plant expression in terms of morphology, structure, biochemistry, and so on. Genetic control studies, gene linkage / QTL directing tests for insect resistance. Traditional and modern varieties of insect resistance, some achievements and applicability.

17. Genetics and breeding for drought tolerance by MAS

Evaluation of morphological, anatomical, structural, physiological and biochemical manifestations related to drought tolerance in plants. Genetic control studies, genetic / QTL linkage tests for drought-related traits. Drought tolerant and traditional drought tolerance methods, some achievements in plant species.

18. Genetics and breeding for salt tolerance by MAS

Evaluation of plant, morphological, physiological, and biochemical manifestations related to salt tolerance in plants. Genetic control studies, molecular linkage / QTL linkage tests for salinity tolerance. The traditional and modern methods of salinity tolerance, some achievements in plant species.

19. Genetics and breeding for tolerance to adverse temperatures by MAS

Evaluation of plant, morphological, anatomical, physiological, and biochemical manifestations related to plant heat tolerance. Genetic control studies, genetic / QTL linkage tests for heat-related traits. The traditional and modern methods of salinity tolerance, some achievements in plant species.

20. Genetics and breeding for submergence tolerance by MAS

Submergence and rehabilitation in crops. Assessment of the morphologic, anatomical, and physiological implications of postharvest tolerance. Genetic control studies, molecular linkage / QTL linkage tests for plant growth tolerance / tolerance. The breeding methods are subject to traditional and modern, some achievements.

10. Scientific research and doctoral dissertation

10.1. Scientific research

Scientific research is a specific stage, compulsory in the process of researching the doctoral dissertation. Each student must conduct a thesis in the form of research, investigation and experiment to supplement the necessary data, so that the researcher reaches a new knowledge or new solution. These are the most important institutions for PhD students to write.

Ph.D. students must ensure the truthfulness, accuracy and novelty of their scientific research results, and abide by the intellectual property regulations of Vietnam and the world.

10.2. Publication

Ph.D. students must publish at least two papers related to the dissertation in scientific journals included in the list of journals published by the State Council for Professors (according to five articles published) or in the following journals list. There must be at least 01 post in the Journal of Science and Development of Vietnam Agricultural Academy and must have at least 01 NCS post as the main author.

Order	Journal	Publishing company
1	National and international foreign scientific journals are written in one of the following languages: English, Russian, French, German, Chinese, Spanish.	By the State Council for Professors
2	Other foreign scientific journals to be decided by the Council for Professor Title (including works scores, not exceeding 1 point)	By the State Council for Professors
3	Agriculture and Rural Development Journal	Ministry of Agriculture and rural development
4	Science and development Journal	VNUA
5	Journal of Sciences VNU (tên cũ: Tạp chí Khoa học - KHTN)	Hanoi National University
6	Sciences of Cantho University	Cantho University
7	Sciences of Hue University	Hue University
8	Sciences & Technique of Thainguyen University	Thainguyen University

Order	Journal	Publishing company
9	Sciences & Technique	Vietnam Sciences and Technique Institute
10	Biology Journal	Vietnam Sciences and Technique Institute
11	Applied Genetics	Hanoi National University

PhD students are required to attend and present at least two national seminars (encouraging participation and presentation of international conferences) on dissertation-related content.

10.4. Doctoral Thesis

The doctoral dissertation must be an innovative scientific research project of the graduate student who has contributed theoretically and practically in the field of research or new solutions of value in the development and increase scientific knowledge in the field of research, creative solving of the problems of science or socio-economic realities.

The dissertation must have new academic contributions, presented in scientific language, using the basic arguments of science to analyze and comment on the points and results achieved in the Previous research related to the topic of the dissertation, on the basis of which the new problem, the new hypothesis or new solutions to solve the problems of the thesis and prove with new materials. The author of the dissertation must have the honor of his scientific work. Encourage students to write and defend their thesis in English.

The doctoral dissertation has a maximum of 150 A4 pages, excluding annexes, of which at least 50% of the papers present the research results and the dissertation of the PhD student.

The format of the thesis must be presented in accordance with the regulations of the Vietnam Agricultural Academy and evaluated through two levels: Department level and Institute level.

11. List of lecturers

	Courses	Unit in charge	Lecturers		
			Name	Year of Birth	The highest degree
1.	Developmental genetics and control of adaptive potentials in crop plants	Genetics and plant breeding Department	Nguyễn Hồng Minh Vũ Đình Hòa, Nguyễn Thanh Tuấn	1952 1952 1982	Ass. Prof Ass. Prof PhD
2.	Genetics and breeding crops for high quality		Vũ Văn Liết Trần Văn Quang Vũ Thị Thu Hiền Nguyễn Văn Cương	1954 1973 1975 1959	Prof Ass. Prof Ass. Prof Ass. Prof
3.	Development of genetic tools in plant breeding		Vũ Văn Liết Trần Văn Quang Vũ Thị Thu Hiền Nguyễn Văn Cương	1954 1973 1975 1959	Prof Ass. Prof Ass. Prof Ass. Prof
4.	Management and		Vũ Văn Liết	1954	Prof

	Courses	Unit in charge	Lecturers		
			Name	Year of Birth	The highest degree
	utilization of plant germplasm for breeding		Trần Văn Quang Vũ Thị Thu Hiền Nguyễn Văn Cương	1973 1975 1959	Ass. Prof Ass. Prof Ass. Prof
5.	Genetics and breeding crops for tolerance to abiotic stresses		Vũ Văn Liết Trần Văn Quang Vũ Thị Thu Hiền Nguyễn Văn Cương	1954 1973 1975 1959	Prof Ass. Prof Ass. Prof Ass. Prof
6.	Genetics and breeding crops for resistance to insect pests and diseases		Vũ Đình Hòa, Vũ Thị Thu Hiền, Hà Việt Cường,	1952 1975 1970	Ass.Prof Ass.Prof
7.	Management of plant breeding programs		Vũ Đình Hòa, Nguyễn Hồng Minh Trần Văn Quang	1952 1973	Ass.Prof Ass.Prof Ass.Prof
8.	Genetics and breeding crops for high yield		GS.TS. Vũ Văn Liết PGS.TS Trần Văn Quang PGS.TS Vũ Thị Thu Hiền	1954 1973 1975	Prof. Ass.Prof Ass.Prof
9.	High technology in plant cultivation	Vegetables, Fruits and Flowers Dep.	Trần Thị Minh Hằng Nguyễn Tất Cảnh	1971 1958	Ass.Prof Ass.Prof
10.	Advances in Plant Disease Management	Plant disease Dep.	Nguyễn Văn Viên Đỗ Tấn Dũng Ngô Bích Hào Hà Việt Cường Trần Nguyễn Hà Nguyễn Đức Huy		Ass.Prof Ass.Prof Ass.Prof Ass.Prof PhD PhD

12. Facilities for learning

12.1. Laboratory and equipment systems

Theoretical and audiovisual classrooms in the room: The Vietnamese Academy of Agricultural Sciences has introduced a modern and well-designed lecture system. The Faculty of Agronomy has modern classrooms and facilities for training, fostering, professional practice and seminars. Practical computer labs: In these computer labs are also networked for NCS to exchange and search information online, there are some specialized software for the program Genetic and Plant Variety. In addition, the Department of Genetics and Plant Genetics direct specialized management with full laboratories and practice labs and field experiments to ensure that the PhD students do well research dissertation learn. The institute also has research institutes, centers and companies that have scientific research activities to help NCS departments in the Faculty of Agriculture can combine theory and practice.

In addition, the Department of Agriculture has established links with grassroots units,

organizations in different sectors, centers, research institutes, enterprises This place is also a training place for NCS, which is the place to receive human resources training from the school, where the application of research results, also provide feedback on the quality requirements training.

12.2. Library

Library system and reading room: PhD students can use two facilities: library center of the VNUA and library of the Agronomy Faculty. The Faculty of Agronomy has 738 books including textbooks, reference materials, professional services for research and training. In addition, the library has 138 textbooks and English language reference materials for the advanced crop science program. Especially, the library of the VNUA with thousands of different books in Vietnamese, English and other foreign languages . The new library system is updated on how to look up, borrow and return books and documents quickly and economically.

12.3. Textbooks/Lessons

Code	Courses	Textbooks/Lessons	The writer's name	Publishing company	Year
NH0811	Developmental genetics and control of adaptive potentials in crop plants	Lessons	Ass.Prof. Nguyễn Hồng Minh		
NH0817	Genetics and breeding crops for high quality	Lessons	Prof. Vũ Văn Liết		
NH0812	Development of genetic tools in plant breeding	Lessons	Prof. Vũ Văn Liết		
NH0813	Management and utilization of plant germplasm for breeding	Lessons	Prof. Vũ Văn Liết		
NH0815	Genetics and breeding crops for tolerance to abiotic stresses	Lessons	Prof. Vũ Văn Liết		
NH0814	Genetics and breeding crops for resistance to insect pests and diseases	Lessons	Ass.Prof. Vũ Đình Hòa,		
NH0816	Quản lý chương trình tạo giống cây trồng	Lessons	Ass.Prof. Vũ Đình Hòa,		
NH0818	Genetics and breeding crops for high yield	Lessons	Prof. Vũ Văn Liết		
NH0821	High technology in plant cultivation	Lessons	Ass.Prof. Trần Thị Minh Hằng	VNUA	
NH0804	Advances in Plant Disease Management	Lessons			

13. Program Implementation Guide

To comply with the current regulations and regulations on doctoral training of the Ministry of Education and Training and the Vietnam Academy of Agriculture

14. Program Specification

PRESIDENT