

VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE

FACULTY OF ANIMAL SCIENCE



PROGRAM SPECIFICATION

BACHELOR OF ANIMAL SCIENCE

HANOI, 2020

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PROGRAM SPECIFICATION

Program title: Animal Science
Option 1: Animal production and health
Option 2: Animal nutrition and feed technology
Program code: 762 01 06
Type of program: Full-time
Program duration: 4 years
Total required credits: 131 (119 Compulsory, 90.8% + 12 Elective, 9.2 %)
Degree name: Bachelor of Animal Science
Awarding Institution: Vietnam National University of Agriculture

1. PROGRAM OBJECTIVES AND EXPECTED LEARNING OUTCOMES

1.1 Program objectives (PO)

For the first few years after graduation, graduates can:

PO1: Specialised skills and professional attitude

Work as technical consultants, extension workers, business people, and managers in livestock production with ethical and professional manners.

PO2: Development of livestock sector and international integration

Pursue lifelong learning and scientific research to create knowledge and solutions for livestock production in the era of global integration.

PO3: Social responsibilities

Perform animal production techniques and health care for the sustainable development of livestock production with whole hearted responsibility.

1.2 Expected learning outcomes (ELOs)

After completing the program, students can:	
General knowledge	ELO1: Apply the general knowledge of natural and social sciences and the understanding of contemporary issues to the field of livestock production
Professional knowledge	ELO 2: Analyze factors affecting the animal breed production, nutrition, and animal health
	ELO 3: Evaluate the efficiency of animal breed production, nutrition and animal health
	ELO 4: Design livestock production programs to ensure sustainable development
General skills	ELO 5: Apply effectively creative and critical thinking, and problem-solved skills to scientific research and professional practice
	ELO 6: Coordinate teamwork in professional activities to achieve objectives as a member or a manager
	ELO 7: Communicate effectively using multimedia, adapt well in multi-cultural environment; meet the required standards of English proficiency issued by Ministry of Education and Training
Professional skills	ELO 8: Use effectively the skills of surveying, collecting and processing data to serve scientific research, technology development and management of livestock production
	ELO 9: Apply appropriate techniques, technologies and systems in sustainable livestock production
	ELO 10: Utilize information technology and modern equipment in livestock industry to serve production and business to achieve objectives
	ELO 11: Perform properly the basic and intensive technical procedure in livestock production
Ethics attitudes	ELO 12: Comply with state law and specific regulations and professional ethics
	ELO 13: Demonstrate responsibility to protect the environment, public health and respect animal welfare
	ELO 14: Perform the habits of life-long learning

2. CAREER PROSPECTS

Graduates of animal science can work in the position and workplaces as followings:

- Graduates can work as nutrient scientists, experts of animal breeding, feeding, and production managers;
- Graduates can work as technicians in laboratories related to animal husbandry, especially in the field of animal genetic and breeding, artificial insemination and feed analysis;
- Graduates can work at government departments related to animal husbandry;
- Graduates can work as agricultural extension officers;
- Graduates can work as researchers at universities/research institutes;
- Graduates can be the owner of animal farms, companies or private enterprises in the field of animal husbandry.

3. POST-GRADUATE STUDY OPPORTUNITIES

- The student graduated from the Animal Science bachelor program can continue to study and research at master and doctoral levels in Animal Science and other related fields such as Animal Science and Veterinary Medicine, Animal nutrition and Feed Technology in Vietnam and abroad.
- Self-study to improve the professional knowledge and to fulfill the requirements of changing jobs.

4. ADMISSION TO THE PROGRAM

Applicants must satisfy the University's general and specific requirements for admission to the program:

Vietnamese students

People who graduated from high school can be admitted by 3 methods: (1) Direct admission to the university for outstanding pupils; (2) Based on high school academic results; (3) Based on the results of the national high school graduation exam organized by the Ministry of Education and Training

(Note: Enrollment methods are reviewed annually and maybe subjected to change)

International students

International students who graduated from high school and submitted academic transcripts and a motivation letter to the International Cooperation Office. The International Cooperation Office will be responsible to contact with Office of Education Management and relevant faculties for approval.

5. EDUCATIONAL PHILOSOPHY, TEACHING AND LEARNING STRATEGIES

Educational Philosophy

Consistent with the university's educational philosophy, the educational philosophy of Faculty of Animal Science is "***The professionalism is founded on the basis of creative thinking, passion and professional ethics***".

Additionally, the educational philosophy of BAS program is "***Learning by doing***". This educational philosophy is disseminated and the applied in all teaching and learning activities by students, lecturers and staffs of the Faculty.

Teaching and learning strategy

Lecturers play an important role in advising students how to improve their knowledge throughout lectures and other useful activities. Teaching and learning strategies are:

- Theory study combined with laboratory practice, field study at animal farms, internship at companies, joining scientific research activities;
- Students are encouraged for self-study and teamwork;
- Students participate in social activities and community services.

6. ASSESSMENT METHODS

Student assessment needed to be consistent with expected learning outcomes of the program. Assessment methods include formative evaluation, midterm test, and summative assessment. In the last semester (8th semester), all students have to take the graduation thesis. Students practice in four months at an animal farm under the supervision of lecturers and other experts at the farm. The final thesis is graded by supervisor, a reviewer and a committee.

7. REGULATION OF ASSESSMENT AND ACADEMIC STANDARDS

Grading system: 4 - point scale

Summary of grade and mark classification

No	10-point scale GPA	4-point scale GPA		Pass/Fail	Classification
		Grade	Score		
1	8.5 – 10	A	4.0	Pass	Outstanding
2	8.0 – 8.4	B+	3.5	Pass	Excellent
3	7.0 – 7.9	B	3.0	Pass	Good
4	6.5 – 6.9	C+	2.5	Pass	Good
5	5.5 – 6.4	C	2.0	Pass	Pass
6	5.0 – 5.4	D+	1.5	Pass	Pass
7	4.0 – 4.9	D	1.0	Conditional Pass	Conditional Pass
8	< 4.0	F	0	Fail	Fail

Summary of Degree classification

No	Cumulative Point Average	Degree classification
1	3.60 – 4.00	Outstanding
2	3.20 – 3.59	Excellent
3	2.50 – 3.19	Good
4	2.00 – 2.49	Pass
5	< 2.00	Fail

Training process

The program is organized in 8 semesters, 2 semesters/year (the summer semester is organized for the courses needed by students). The maximum time for studying is 6 years.

Students need to accumulate a total of 131 credits (119 compulsory credits, 12 elective credits). Students are also required to complete 3 credits for physical training, 11 credits for Citizen Military training, 6 credits for soft skill training and 4 credits for computer skills.

Award requirements

Students are eligible for graduation when completing a total of 131 credits of the program, having an accumulative point average above 2.0 and the minimum English proficiency is equivalent to (or higher than) level B1 of The Common European Framework of Reference for Languages, achieving physical, information technology, Citizen Military Training and soft skill certificates, having paid all tuition fees, completing students' obligations and submitting forms to Office of Education Management of the University for graduation.

8. CURRICULUM STRUCTURE & CONTENT

8.1 Curriculum structure of BAS program according to blocks

(APH: Animal Production and Health option, ANF: Animal nutrition and Feed technology, NCR: Non-Credit, Value in the bracket is a credit number)

A. GENERAL (43)	B. FUNDAMENTAL: <i>APH (23), ANF (20)</i>	C. PROFESSIONAL <i>APH (32), ANF (35)</i>	D. PRAC. EXPERIENCE (23)
A1. COMPULSORY (29)	B1. COMPULSORY: <i>APH (21), ANF (18)</i>	C1. COMPULSORY <i>APH (26), ANF (29)</i>	D1. COMPULSORY (23)
<i>Politics (13)</i>	Common (18)	Common (16)	Common (10)
Marxism - Leninism Philosophy (3)	Zoology (3)	Animal Breeding (3)	Internship 1: Animal Production Internship 1 (10)
Marxism – Leninism Political Economy (2)	General Biochemistry (2)	Animal Feed and Feeding (2)	APH (13)
Scientific Socialism (2)	Animal Biochemistry (2)	Agrarian Systems (2)	Vocational Practice of Animal Production 1 (1)
History of the Communist Party Vietnam (2)	Animal Physiology 1 (2)	Pig Production (3)	Vocational Practice of Vet. (2)
Ho Chi Minh Ideology (2)	Animal Physiology 2 (2)	Poultry Production (3)	Internship 2: Animal Production Internship 2 (10)
Introduction to Laws (2)	Animal Genetics (2)	Ruminant Production (3)	
<i>Natural science (16)</i>	Animal Nutrition (3)	APH (10)	ANF (13)
	Experimental Design (2)	Livestock Waste Management (2)	Vocational Practice of Feed Production (3)
Advanced Mathematics (3)	APH (3)	Vet. Infectious Diseases 1 (2)	Internship 3: Internship on Feed production (10)
General Biology (2)	Animal Anatomy 1 (3)	Veterinary Hygiene (2)	
Probability and Statistics (3)	B2. ELECTIVE (2)	Vet. Pharmacology & Toxicology (2)	E. GRADUATION THESIS (10)
General microbiology (2)	Common	Vet. Diagnosis and Internal Medicine (2)	Graduation Thesis (10)
Ecology and Environment (2)	Veterinary Histology 1 (2)	ANF (13)	F. CONDITIONAL (NCR)
Organic Chemistry (2)	APH	Feed Crops (2)	Physical Education
Analytical Chemistry (2)	Molecular Biology 1 (2)	Applied Microbiology in Animal Science (2)	Citizen Military Training

<p>A2. ELECTIVE (4) Biodiversity (2)</p> <p>Animal Behaviour and Welfare (2) Writing a Scientific Paper (2) Introduction to Psychology (2)</p> <p>A3. SUPPLEMENT (10) <i>Foreign language (8)</i> English 1 (3) * English 2 (3) English for animal husbandry (2) <i>Information technology (2)</i> Introduction to Informatics (2)</p>	<p>ANF Animal Anatomy 1 (3)</p>	<p>Basic of Marketing 1 (2) Livestock Feed Processing Equipment (3) Industrial Feed Technology (2) Feed Quality Evaluation (2) C2. ELECTIVE (6) General Aquaculture (2) Feed Supplements and Additive (2) Project Management (3) APH Nutritional Disease in Animals (2) Goat and Rabbit production (2) Animal Reproduction 1 (2) Engineering in Animal Production (2) Veterinary Parasitology 1 (2) Applied Microbiology in Animal Science (2) ANF Engineering in Animal Production (2) Goat and Rabbit production (2) Livestock Waste Management (2) Nutritional Disease in Animals (2) Principle of HACCP and Application in Feed Manufacturing (2) Vet. Infectious Diseases 1 (2) Introduction to Vet. Medicine (2)</p>	<p>Supplement to Informatics Soft skills</p>
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*Before taking English 1, students must take an exam to assess their English level at the entrance. If they do not meet the requirements, they will have to take two English courses, which are Supplementary English in semester 1 and English 0 in semester 2 and do not count into the program's credits.

8.2 Curriculum content (CR: credit, TH: Theory, PR: Practice, C/E= Compulsory/ Elective)

No	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
			CR	TH	PR	C/E	CR	TH	PR	C/E		
GENERAL COURSES			43				43					
1	ML01009	Introduction to Laws	2	2	0	C	2	2	0	C		
2	TH01011	Advanced Mathematics	3	3	0	C	3	3	0	C		
3	SH01001	General Biology	2	1.5	0.5	C	2	1.5	0.5	C		
4	ML01020	Marxism - Leninism Philosophy	3	3	0	C	3	3	0	C		
5	MT01002	Organic Chemistry	2	1.5	0.5	C	2	1.5	0.5	C		
6	ML01021	Marxism – Leninism Political Economy	2	2	0	C	2	2	0	C		
7	TH01007	Probability and Statistics	3	3	0	C	3	3	0	C		
8	TH01009	Introduction to Informatics	2	1	1	C	2	1	1	C		
9	MT01004	Analytical Chemistry	2	1.5	0.5	C	2	1.5	0.5	C		
10	SN01032	English 1	3	3	0	C	3	3	0	C		
11	ML01022	Scientific Socialism	2	2	0	C	2	2	0	C		
12	ML01005	Ho Chi Minh Ideology	2	2	0	C	2	2	0	C		
13	MT01008	Ecology and Environment	2	2	0	C	2	2	0	C		
14	ML01023	History of the Communist Party Vietnam	2	2	0	C	2	2	0	C		
15	SN01033	English 2	3	3	0	C	3	3	0	C	SN01032	English 1
16	CN01201	General Microbiology	2	1.5	0.5	C	2	1.5	0.5	C	SH01001	General Biology
17	SN01016	Introduction to Psychology	2	2	0	E	2	2	0	E		
18	CN01203	Animal Behaviour and Welfare	2	1.5	0.5	E	2	1.5	0.5	E		

No	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
			CR	TH	PR	C/E	CR	TH	PR	C/E		
19	CN01103	Biodiversity	2	1.5	0.5	E	2	1.5	0.5	E		
20	SN03049	English for Animal Husbandry	2	2	0	C	2	2	0	C	SN01033	English 2
21	CN01302	Writing a Scientific Paper	2	1.5	0.5	E	2	1.5	0.5	E		
FUNDAMENTAL COURSES			23				20					
22	CN02101	Zoology	3	2	1	C	3	2	1	C		
23	CN02303	Animal Physiology 1	2	1.5	0.5	C	2	1.5	0.5	C		
24	CN02305	Animal Physiology 2	2	2	1	C	3	2	1	C		
25	CN02301	General Biochemistry	2	1.5	0.5	C	2	1.5	0.5	C		
26	CN02302	Animal Biochemistry	2	1.5	0.5	C	2	1.5	0.5	C		
27	CN02601	Animal Nutrition	3	2.5	0.5	C	3	2.5	0.5	C		
28	CN02501	Animal Genetics	2	1.5	0.5	C	2	1.5	0.5	C		
29	CN02701	Experimental Design	2	1.5	0.5	C	2	1.5	0.5	C		
30	TY02001	Domestic Animal Anatomy 1	3	2.5	0.5	C	3	2.5	0.5	E		
31	TY02003	Veterinary Histology 1	2	1.5	0.5	E	2	1.5	0.5	E		
32	SH01006	Fundamental Molecular Biology	2	1.5	0.5	E	-	-	-	-		
SPECIALIZED COURSES			65				68					
33	CN03302	Animal Feed and Feeding	2	1.5	0.5	C	2	1.5	0.5	C		
34	CN03101	Animal Breeding	3	2.5	0.5	C	3	2.5	0.5	C	CN02501	Animal genetics
35	CN03501	Pig Production	3	2	1	C	3	2	1	C	CN03101	Animal breeding
36	CN03503	Poultry Production	3	2	1	C	3	2	1	C	CN03101	Animal breeding
37	CN03502	Cattle and Buffalo Production	3	2	1	C	3	2	1	C	CN03101	Animal breeding

No	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
			CR	TH	PR	C/E	CR	TH	PR	C/E		
38	CN04813	Animal Production Internship 1	10	0	10	C	10	0	10	C	Parallel course CN03501	Pig Production
39	CN03510	Agrarian Systems	2	1.5	0.5	C	2	1.5	0.5	C		
40	CN03509	Livestock Waste Management	2	1.5	0.5	C	2	1.5	0.5	C		
41	KQ03107	Basic of Marketing 1	2	2	0	E	2	2	0	C		
42	CN03201	Applied Microbiology in Animal Science	2	1.5	0.5	E	2	1.5	0.5	C	CN01201	General Microbiology
43	CN03303	Feed Crops	2	1.5	0.5	E	2	1.5	0.5	C		
44	CN03307	Feed Supplements and Additives	2	1.5	0.5	E	2	1.5	0.5	E		
45	TS03710	General Aquaculture	2	1.5	0.5	E	2	1.5	0.5	E		
46	CN03308	Nutritional Disorders in Animals	2	2	0	E	2	2	0	E		
47	KT03031	Project Management	3	3	0	E	3	3	0	E		
48	CN03504	Goat and Rabbit production	2	1.5	0.5	E	2	1.5	0.5	E		
49	CD03204	Engineering in Animal Production	2	1.5	0.5	E	2	1.5	0.5	E		
50	TY03051	Veterinary Infectious Diseases 1	2	1.5	0.5	C	2	1.5	0.5	E		
51	TY03014	Veterinary Hygiene 1	2	1.5	0.5	C	-	-	-	-		
52	TY03036	Veterinary pharmacology and Toxicology	2	1.5	0.5	C	-	-	-	-		
53	TY03035	Veterinary Diagnosis and Veterinary Internal Medicine	2	1.5	0.5	C	-	-	-	-		

No	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
			CR	TH	PR	C/E	CR	TH	PR	C/E		
54	CN03802	Vocational Practice of Animal Production 1	1	0	1	C	-	-	-	-		
55	TY03062	Vocational Practice of Veterinary	2	0	2	C	-	-	-	-		
56	CN04814	Animal Production Internship 2	10	0	10	C	-	-	-	-	Parallel courses (CN03502 or CN03503)	Cattle and Buffalo production or Poultry production
57	TY03053	Veterinary Reproduction 1	2	1.5	0.5	E	-	-	-	-		
58	TY03011	Veterinary Parasitology 1	2	1.5	0.5	E	-	-	-	-		
59	CD03434	Livestock Feed Processing Equipment	-	-	-	-	3	2	1	C		
60	CN03305	Industrial Feed Technology	-	-	-	-	2	2	0	C		
61	CN03306	Feed Quality Evaluation	-	-	-	-	2	1.5	0.5	C		
62	CN04815	Internship on Feed production	-	-	-	-	10	0	10	C	Parallel course CN03305	Industrial Feed Technology
63	CN04806	Vocational Practice of Feed Production	-	-	-	-	3	0	3	C		
64	TY03034	Introduction to Veterinary Medicine	-	-	-	-	2	1.5	0.5	E		
65	CN03304	Principle of HACCP and Application in Feed Manufacturing	-	-	-	-	2	2	0	E		
66	CN04997	Graduation Thesis	10	0	10	C	10	0	10	C	CN04813	Animal Production Internship 1

Soft skill training (students must obtain 6 credits)

Course code	Course name	Credits	Course status
KN01002	Leadership Skills	2	Elective
KN01001	Communication Skills	2	Elective
KN01003	Self -management Skills	2	Elective
KN01004	Job searching Skills	2	Elective
KN01005	Teamwork Skills	2	Elective
KN01006	International Integration	2	Elective

Physical and Citizen Military training

Module title	Course code	Course name	Credits	Course status
Physical education	GT01016	General Physical Education	1	Compulsory
	GT01017	Athletics	2	Elective
	GT01018	Aerobics		Elective
	GT01019	Soccer		Elective
	GT01020	Volleyball		Elective
	GT01021	Basketball		Elective
	GT01022	Badminton		Elective
	GT01023	Chess		Elective
	GT01014	Dance sport		Elective
	GT01015	Swimming		Elective
Citizen Military education	QS01011	Citizen Military Training 1	3	Compulsory
	QS01012	Citizen Military Training 2	2	Compulsory
	QS01013	Citizen Military Training 3	2	Compulsory
	QS01014	Citizen Military Training 4	4	Compulsory
Total			14	

Courses for computer skills (students must obtain 4 credits)

Module title	Course code	Course name	Credits	Course status
Computer skills	ITC03001	Application of Information Technology in Agriculture	2	Elective
	ITC03002	Application of Information Technology in Economics and Society	2	Elective
	ITC03003	Application of Information Technology in Resource and Environment Management	2	Elective
	ITC03004	Computer Graphic Design	2	Elective
	ITC03005	Basic Web Application Development	2	Elective

9. STUDY PLAN (SAMPLE) (CR: credit, TH: Theory, PR: Practice, C/E= Compulsory/ Elective)

Year	Semester	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
				C R	TH	PR	C/E	CR	TH	PR	C/E		
1	1	ML01009	Introduction to Laws	2	2	0	C	2	2	0	C		
1	1	TH01011	Advanced Mathematics	3	3	0	C	3	3	0	C		
1	1	SH01001	General Biology	2	1.5	0.5	C	2	1.5	0.5	C		
1	1	SN00010	An Introduction to CEFR-based Tests	1	1	0	-	1	1	0	-		
1	1	ML01020	Marxism - Leninism Philosophy	3	3	0	C	3	3	0	C		
1	1	MT01002	Organic Chemistry	2	1.5	0.5	C	2	1.5	0.5	C		
1	1	TH01009	Introduction to Informatics	2	1	1	C	2	1	1	C		
1	1	MT01004	Analytical Chemistry	2	1.5	0.5	C	2	1.5	0.5	C		
1	1	QS01011	Citizen Military Training 1	3	3	0	-	3	3	0	-		
1	1	QS01012	Citizen Military Training 2	2	2	0	-	2	2	0	-		
1	1	QS01013	Citizen Military Training 3	2	1	1	-	2	1	1	-		
1	1	QS01014	Citizen Military Training 4	4	0.3	3.7	-	4	0.3	3.7	-		
1	1	GT01016	General Physical Education	1	0.5	0.5	-	1	0.5	0.5	-		
1	2	SN00011	English 0	2	2	0	-	2	2	0	-		
1	2	ML01021	Marxism – Leninism Political Economy	2	2	0	C	2	2	0	C		
1	2	CN02101	Zoology	3	2	1	C	3	2	1	C		

Year	Semester	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
				C R	TH	PR	C/E	CR	TH	PR	C/E		
1	2	TH01007	Probability and Statistics	3	3	0	C	3	3	0	C		
1	2	CN02301	General Biochemistry	2	1.5	0.5	C	2	1.5	0.5	C		
1	2	CN02303	Animal Physiology 1	2	1.5	0.5	C	2	1.5	0.5	C		
1	2	MT01008	Ecology and Environment	2	2	0	C	2	2	0	C		
1	2	KN01001-6	Soft skills	6	0.0	6.0	-	6	0.0	6.0	-		
1	2	GT01017-23	Physical courses (choose 2/ 9)	2	0,0	2,0	-	2	0,0	2,0	-		
2	3	SN01032	English 1	3	3	0	C	3	3	0	C		
2	3	ML01022	Scientific Socialism	2	2	0	C	2	2	0	C		
2	3	CN02302	Animal Biochemistry	2	1.5	0.5	C	2	1.5	0.5	C		
2	3	CN02305	Animal Physiology 2	2	1.5	0.5	C	2	1.5	0.5	C		
2	3	CN02501	Animal Genetics	2	1.5	0.5	C	2	1.5	0.5	C		
2	3	CN01201	General Microbiology	2	1.5	0.5	C	2	1.5	0.5	C	SH01001	General Biology
2	3	TY02001	Domestic Animal Anatomy 1	3	2	1	C	3	2	1	E		
2	3	CN01103	Biodiversity	2	1.5	0.5	E	2	1.5	0.5	E		
2	3	TY02003	Veterinary Histology 1	2	1.5	0.5	E	2	1.5	0.5	E		
2	3	SH01006	Fundamental Molecular Biology	2	1.5	0.5	E	-	-	-	-		
2	3	CD03204	Engineering in Animal Production	2	1.5	0.5	E	2	1.5	0.5	E		

Year	Semester	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
				C R	TH	PR	C/E	CR	TH	PR	C/E		
2	4	SN01033	English 2	3	3	0	C	3	3	0	C	SN01032	English 1
2	4	ML01005	Ho Chi Minh Ideology	2	2	0	C	2	2	0	C		
2	4	CN02601	Animal Nutrition	3	2.5	0.5	C	3	2.5	0.5	C		
2	4	CN03101	Animal Breeding	3	2.5	0.5	C	3	2.5	0.5	C	CN02501	Animal genetics
2	4	CN03201	Applied Microbiology in Animal Science	2	1.5	0.5	E	2	1.5	0.5	C	CN01201	General Microbiology
2	4	TY03036	Veterinary Pharmacology and Toxicology	2	1.5	0.5	C	-	-	-	-		
3	4	TY03035	Veterinary Diagnosis and Veterinary Internal Medicine	2	1.5	0.5	C	-	-	-	-		
2	4	SN01016	Introduction to Psychology	2	2	0	E	2	2	0	E		
2	4	CN01203	Animal Behaviour and Welfare	2	1.5	0.5	E	2	1.5	0.5	E		
2	4	KQ03107	Basic of Marketing 1	2	2	0	E	2	2	0	C		
3	5	ML01023	History of the Communist Party Vietnam	2	2	0	C	2	2	0	C		
3	5	SN03049	English for Animal Husbandry	2	2	0	C	2	2	0	C	SN01033	English 2
3	5	CN03302	Animal Feed and Feeding	2	1.5	0.5	C	2	1.5	0.5	C		
3	5	CN03303	Feed Crops	2	1.5	0.5	E	2	1.5	0.5	C		
3	5	CN02701	Experimental Design	2	1.5	0.5	C	2	1.5	0.5	C		
3	5	CN03510	Agrarian Systems	2	1.5	0.5	C	2	1.5	0.5	C		

Year	Semester	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
				C R	TH	PR	C/E	CR	TH	PR	C/E		
3	5	TY03051	Veterinary Infectious Diseases 1	2	1.5	0.5	C	2	1.5	0.5	E		
3	5	TY03062	Vocational Practice of Veterinary	2	0	2	C	-	-	-	-		
3	5	CN03306	Feed Quality Evaluation	-	-	-	-	2	1.5	0.5	C		
3	5	TY03014	Veterinary Hygiene 1	2	1.5	0.5	C	-	-	-	-		
3	5	CD03434	Livestock Feed Processing Equipment	-	-	-	-	3	2	1	C		
3	5	CN03504	Goat and Rabbit Production	2	1.5	0.5	E	2	1.5	0.5	E		
3	5	CN01302	Writing a Scientific Paper	2	1.5	0.5	E	2	1.5	0.5	E		
3	5	TY03034	Introduction to Veterinary Medicine	-	-	-	-	2	1.5	0.5	E		
3	6	CN03509	Livestock Waste Management	2	1.5	0.5	C	2	1.5	0.5	E		
3	6	CN03802	Vocational Practice of Animal Production 1	1	0	1	C	-	-	-	-		
3	6	CN03501	Pig Production	3	2	1	C	3	2	1	C	CN03101	Animal breeding
3	6	CN04813	Animal Production Internship 1	10	0	10	C	10	0	10	C	Parallel course CN03501	Pig Production
3	6	CN04806	Vocational Practice of Feed Production	-	-	-	-	3	0	3	C		
3	6	CN03307	Feed Supplements and Additives	2	1.5	0.5	E	2	1.5	0.5	E		
3	6	TS03710	General Aquaculture	2	1.5	0.5	E	2	1.5	0.5	E		

Year	Semester	Code	Course name	Option 1				Option 2				Prerequisite code	Prerequisite name
				C R	TH	PR	C/E	CR	TH	PR	C/E		
4	7	CN03503	Poultry Production	3	2	1	C	3	2	1	C	CN03101	Animal breeding
4	7	CN03502	Cattle and Buffalo Production	3	2	1	C	3	2	1	C	CN03101	Animal breeding
4	7	CN04814	Animal Production Internship 2	10	0	10	C	-	-	-	-	Parallel courses (CN03502 or CN03503)	Cattle and Buffalo production or Poultry production
4	7	CN03305	Industrial Feed Technology	-	-	-	-	2	1.5	0.5	C		
4	7	CN04815	Internship on Feed Production	-	-	-	-	10	0	10	C	Parallel course CN03305	Industrial Feed Technology
4	7	TY03053	Veterinary Reproduction 1	2	1.5	0.5	E	-	-	-	-		
4	7	TY03011	Veterinary Parasitology 1	2	1.5	0.5	E	-	-	-	-		
4	7	CN03308	Nutritional Disorders in Animals	2	2	0	E	2	2	0	E		
4	7	CN03304	Principle of HACCP and Application in Feed Manufacturing	-	-	-	-	2	2	0	E		
4	7	KT03031	Project Management	3	0	3	E	3	0	3	E		
4	8	CN04997	Graduation Thesis	10	0	10	C	10	0	10	C	Animal Production Internship 1	CN04813

10. COURSE CONTENT AND WORKLOAD

10.1 GENERAL KNOWLEDGE

1. ML01020. Marxism - Leninism Philosophy (3 credits: 3-0-6). The course is consisted of the following content: Chapter 1: Outline of Philosophy and Marxism - Leninism philosophical school; Chapter 2: Dialectical Materialism; Chapter 3: Historical Materialism.

2. ML01021. Marxism – Leninism Political Economy (2 credits: 2-0-6). The course is consisted of six chapters introducing the following content: Objective, research methodology, and function of Marxism – Leninism Political Economy; Commodity, market, and roles of economic agents; Surplus value; Competition and monopoly; Socialist-oriented market economy and relations of economic interest in Vietnam; Industrialization, modernization and international economic integration of Vietnam.

3. ML01022. Scientific Socialism (2 credits: 2-0-6). The course is consisted of the following content: Introduction to Scientific Socialism; Historical mission theory of the proletariat; Socialism and Socialist Transition; Socialist Democracy and Socialist State; Structure of Social classes and League of social classes in the socialist transition; Issues of ethnicity and Religion in socialist transition; Issues of Family in socialist transition.

4. ML01023. History of the Communist Party of Vietnam (2 credits: 2-0-6). The course is consist of chapters: Objects, functions, tasks, content and methods of studying and studying History of the Communist Party of Vietnam, The Communist Party of Vietnam was born and led the struggle for power (1930-1945), The Party led the two resistance wars to complete the national liberation and reunification of the country (1945-1975); The Party led the country in the transition to socialism and carried out the renovation work (1975-2018), Conclusion on the great victories of the Vietnamese revolution and great lessons on the leadership of the Party.

5. ML01005. Ho Chi Minh Ideology (2 credits: 2–0–6). This course covers the following contents: Objectives, research methods and courses meanings; The foundation and process of Ho Chi Minh ideology's formation and development; The idea of National issues and Revolutionary Liberation; The idea of Socialism and the road of transition to Socialism in Vietnam; The idea of the Communist Party of Vietnam; The idea of domestic ethnics' unity and international solidarity; The idea of building a State of the people, by the people and for the people; The idea of culture, morals and new people.

6. ML01009. Introduction to Laws (2 credits: 2-0– 6). This course provides some basic theoretical issues of State and Laws. Basic background on Civil Laws and Criminal Laws. Basic background on Economic Laws, Labour Laws, Laws on Marriage and Family. Basic background on Administrative Laws and Laws on the prevention and combat of corruption.

7. MT01002 - Organic chemistry (2 credits: 1,5 - 0,5 – 6)

The course consists of the following contents: The isomerism; the interactions between atoms and groups of atoms in molecules of organic compounds; the structure and property of important organic compounds; the reaction mechanism of some popular organic reactions; the

structure, the property and the role of some groups of natural compounds such as glucose, lipid, amino acids and protein. The practical part consists of the qualitative exercise of the chemical properties of basic organic compounds (3 lab exercises).

8. MT01004 - Analytical Chemistry (2 credits: 1,5 - 0,5 – 6)

The course aims to provide the basic knowledge in analytical chemistry for the students. The content of these lessons consists of three chapters as follows: Chapter 1: The basic concepts of analytical chemistry; Chapter 2: Gravimetric method of analysis; Chapter 3: Titrations in analytical chemistry.

9. MT01008. Ecology and Environment (2 credits: 2-0-6).

This course will provide general knowledge on the general concept of ecology including: (1) interactions between organisms and the environment at the individual level; Populations and interactions among organisms in the community; (2) Population: concepts, characteristics and dynamics; (3) Community: concepts, components, characteristics and dynamics; (4) Ecosystem: composition, structure and dynamics of the ecosystem; (5) Major ecosystems; (6) The relationship between natural resources, the environment and development.

10. SH01001 - General Biology (2 credits: 1,5 – 0,5 – 6).

This course covers the following contents: Scientific study of life; Two main forms of cells; Bioenergetics of cells; Reproduction and cell cycle; Regulation and adaptation to environment of organism; An evolutionary framework for biology and practices of using microscope

11. SN01032 - English 1 (3 credits: 3 - 0 - 9).

This course consists of five units at pre-intermediate level about the five topics including It's a great job (Unit 1), Great vacations (Unit 2), Cities around the world (Unit 3), Wildlife (Unit 4), All about sports (Unit 5). In each unit, English grammar, vocabulary, and skills are provided and practiced by students through different parts: Start, Listening, Vocabulary, Grammar, Reading, Song/Culture, Pronunciation, Conversation Takeaway, Writing Takeaway, Test Takeaway.

12. SN01033 - English 2 (3 credits: 3 - 0 - 9).

This course consists of five units at pre-intermediate level about the five topics including Good luck, bad luck (Unit 1), My favorite things (Unit 2), Memorable experiences (Unit 3), I love chocolate (Unit 4), How can we help? (Unit 5). In each unit, English grammar, vocabulary, and skills are provided and practiced by students through different parts: Start, Listening, Vocabulary, Grammar, Reading, Song/Culture, Pronunciation, Conversation Takeaway, Writing Takeaway and Test Takeaway.

Prerequisite course: English 1

13. SN01016. Introduction to Psychology (2 credits: 2-0-6).

The course provides students with basic knowledge about Psychology as subjects and tasks of psychology; the nature of human psychology; the natural basis and social basis of psychology;

psychological formation, consciousness; cognitive activities; emotional life and human personality.

14. SN03049. English for Animal Science (2 Credits: 2 -0-6). This course consists of 9 units including Unit 1-Organ and organ systems, Unit 2- The digestive system, Unit 3- The skeletal system, Unit 4- The excretory system, Unit 5- The circulatory system, Unit 6- The respiratory system, Unit 7- The nervous system, Unit 8- Gastric function, Unit 9- Number of animals in herb/room.

Prerequisite course: English 2

15. CN01103. Biodiversity (2 credits: 1,5-0,5-6).

This course consists of 5 theoretical chapters on the concept and measurement of biodiversity; the distribution and values of biodiversity; the degradation of biodiversity; the conservation of biodiversity; biodiversity in Vietnam. Three practice sessions including: 1. The comparison of species in the community; 2. The method of evaluating the number of individuals in population; 3. The observation diversity of animals.

16. CN01201. General microbiology (2 credits: 1,5-0,5-6).

This course consists of 6 chapters including: Morphology, cell structure and Reproduction of microorganisms; Microbial physiology; Effects of environmental factors on microbial growth; Microbial genetics; Distribution of microorganisms in nature.

This course also consists three Lab exercises: (1) Lab exercise 1: Microbial smear preparation and Gram staining method; (2) Lab exercise 2: General microscopy techniques and morphological identification of bacteria, fungi and yeasts and (3) Lab exercise 3: General microbial cultivation techniques. *Prerequisite course: General Biology*

17. CN01203. Animal Behaviour and Welfare (2 credits: 1,5-0,5-6).

The course provides students with knowledge about the biological mechanism of animal behavior, and the function of behavior. Explain the behavioral mechanisms based on physiology, genetics and influence of the living environment on behavior. To know the specific behavior in each kind of animals. Research methods on animal behavior and application of behavior to animal husbandry practices. Animal welfare issues, welfare impacts on productivity, quality of livestock products and human health, solutions to improve welfare in livestock production. The course includes 3 practical lessons: (1) Lesson 1: Observing behavior and assessing animal welfare at the zoo; (2) Lesson 2: Watch behavior videos of some wild animals; (3) Lesson 3: Observing the behavior and assessing the welfare of pigs at the pig farm.

18. CN01302. Writing a scientific paper (2 credits: 1,5-0,5-6).

This course consists of 10 theoretical chapters: Scientific research and scientific documents; Scientific style; Outline and research results; Title; Introduction; Overview; Materials and methods; Results and discussion; Conclusion - Summary and Keywords; Citations and references. This course includes three practice sessions: (1) Session 1: Search for references;

(2) Session 2: Use of EndNote software for text editing, searching, managing and citing references; (3) Session 3: Write outline graduation thesis.

19. TH01007. Probability and Statistics (3 credits: 3 – 0 – 9).

This course consists of 7 chapters: Descriptive statistics; Probability; Random variable; Sampling distributions; Estimation; Hypothesis testing; Simple linear regression model.

20. TH01009. Introduction to Informatics (2 credits: 1,5 – 0,5 – 6).

The course consists of 7 chapters: Introduction; Computer organization; Computer software and operating system; Computer networks and the Internet; The social issues of information technology; MS Word and MS PowerPoint; MS Excel.

21. TH01011. Advanced Mathematics (3 credits: 3-0-9).

This course provides basic knowledge about matrix, determinant, system of linear equations, and differential calculus of single-factor and multi-variable functions; integral calculus of single-valued function and the basic concepts of differential equations, methods that solve certain first-degree differential equations.

10.2 FUNDAMENTAL KNOWLEDGE

22. CN02101. Zoology (3 credits: 2 – 1 - 9).

This course consists of 10 theoretical chapters presenting general characteristics, structural characteristics, physiological activities and classification systems of animal phyla (Protozoa, Porifera, Coelenterata, Ctenophora, Plathelminthes, Nemathelminthes, Annelida, Mollusca, Arthropoda, Echinodermata, Chordata phylum). Three practice sessions of invertebrates and three practice sessions of vertebrates: (1) Lab 1: Slipper animalcules and Giant intestinal fluke; (2) Lab 2: Pig roundworm and Earth worm; (3) Lab 3: Apple snail and Cockroach dissection; (4) Lab 4: Carp and Frog dissection; (5) Lab 5: Chicken dissection; (6) Lab 6: Rabbit dissection.

23. CN02301. General Biochemistry (2 credits: 1,5-0,5-6).

This course contains 8 chapters: Protein and amino acids; Vitamins, Enzymes; Nucleic acids; protein and amino acids metabolism; Carbohydrates and carbohydrates metabolism; Lipids and lipids metabolism; Bioenergetics and metabolism. This subject also contains 3 practice lessons: Lesson 1: experiment on amino acids and proteins; Lesson 2: experiment on enzyme and Lesson 3: experiment on carbohydrates

24. CN02302. Animal Biochemistry (2 credits: 1,5-0,5-6).

This course contains 7 chapters: Hormones; Biological membranes and transport; Immune biochemistry; Carbohydrate metabolism in animals; Lipid metabolism in animals; Protein metabolism in animals; Relationship between metabolic processes. The module contains 3 practice lessons: Lesson 1: Practice of carbohydrates metabolism. Lesson 2: Practice of Lipids metabolism and Lesson 3: Practice of protein metabolism

25. CN02303. Animal Physiology 1 (2 credits: 1,5-0,5-6).

This course includes 6 chapters which describe physiological functions of anatomical systems and organs in the body such as: nervous system, endocrinological system, physiological excitation...., and 3 practical lessons which include experiments that aim to prove theoretical lectures; Lesson 1: animal's bioelectricity; Lesson 2: Central nervous system and its application in establishing reflexes in dogs; Lesson 3: Endocrine physiology.

26. CN02305. Animal Physiology 2 (2 credits:1,5-0,5-6).

This course includes 7 chapters which describe physiological functions of anatomical systems and organs in the body: Chapter 1: Digestive system physiology; Chapter 2: Circulatory system physiology; Chapter 3: Blood physiology system physiology; Chapter 4: Respiratory system physiology; Chapter 5: Reproductive physiology; Chapter 6: Urinary system physiology; Chapter 7: Physiology of lactation. The module contains 3 practical lessons which include experiments that aim to prove theoretical lectures: Lesson 1: Determines some physiological indicators of blood Lesson 2: Determines some physiological parameters of respiration and circulation Lesson 3: Methods of studying digestive physiology.

27. CN02501. Animal genetics (2 credits: 1,5-0,5-6).

This course includes these following chapters: genetic materials, molecular genetics, genetics of sex, immunogenetics, population genetics and quantitative genetics. The course includes three practical lessons, as below: - Practice 1: Sample preparation and incubation - Practice 2: Isolation, precipitation, and purification of total DNA - Practice 3: Check and evaluate the DNA quality.

28. CN02601. Animal Nutrition (3 credits: 2,5-0,5-9).

The course includes chapters: Water nutrition; Protein and amino acids nutrition; Vitamin nutrition; Mineral nutrition; Energy nutrition; Energy and estimation of energy value of feeds; Methods for determining the nutritional content of feed; Nutrient requirements for maintenance; Nutrient requirements for growth; Feeding standards for reproduction; Nutrient requirements for milk production; Feeding standards (Definition of feeding standards, feeding standards for animals). The module has 3 practical exercises, including: Lesson 1: Methods of sampling, analyzing dry matter and ash total. Lesson 2: Practice methods for analyzing crude protein, crude lipid, and crude fiber. Lesson 3: Methods of assessing feed quality and selecting feed ingredients and calculating nutrient requirements for animals.

29. CN02701. Experimental Design (2 credits: 1,5-0,5-6).

This course consists of 7 theoretical chapters: Descriptive statistics; Estimating and testing hypotheses; Concepts of experimental design; One-factor experiments (completely random design, complete random block design, Latin squares); Two-factor experiment; Correlation and linear regression; Contingency table. This course includes three practice sessions: (1) Session 1: Descriptive statistics, estimating one sample and compare two samples; (2) Session 2: Compare more than two groups with one and two factors; (3) Session 3: Contingency table.

30. SH01006 Fundamental Molecular Biology (2 credits: 1,5-0,5-6).

This course consists of 7 chapters: Chapter 1 - History of molecular biology; Chapter 2- Macromolecules: Nucleic acid and Protein; Chapter 3- Structure of gene and genome; Chapter 4: DNA replication; Chapter 5: DNA mutation and repair; Chapter 6: Gene transcription in eukaryotic; Chapter 7: Genetic code and translation; and 3 practical lab lessons: Lesson 1-DNA structure model, Lesson 2-simple DNA extraction method and Lesson 3-Chemical and physical properties of DNA and RNA.

31. TY02001. Domestic Animal Anatomy 1 (3 credits: 2-1-9).

This course provides the basic knowledge about the structure of body of animals: cow, buffalo pig, horse, dog, cat, and poultry. The content of the module includes: Introductions about body's organs (skeletal system, muscular system, nervous system and senses, circulatory system, lymphatic system, endocrine system, digestive system, respiratory system, reproductive system, urinary system); the position, the shape, the general structure, the distribution of blood vessel and nerve, functions and the relationship between organs and organ systems inside the body.

32. TY02003. Veterinary Histology 1 (2 credits: 1,5-0,5-6).

This course provides the basic concept, cytology, epithelium, connective tissue, muscular tissue, nervous tissue.

10.3 SPECIALIZED KNOWLEDGE

33. CD03204. Engineering in Animal Production (2 credits:1,5–0,5–6). The course provides the knowledge about the Mechanization of breeding farm; Main equipment in breeding farm; Specialized equipment in different breeding farm; Utilization of mechanical equipment in breeding.

34. CD03434. Livestock Feed Processing Equipment (3 credits: 2-1-6).

The course provides the knowledge about the General concepts of mechanization in livestock feed processing; important machines and equipment in production lines of livestock feed processing; Technological processes and equipment system of livestock feed processing; Basis for designing livestock feed factory.

34. CN03101. Animal breeding (3 credits: 2,5-0,5-6).

This course includes these following chapters: Taming, adapting, and concept of livestock breeds. Evaluate animal traits. Pedigree and genetic relationships between individuals. Genetic parameters and selection response. Breed value and animal selection methods. Pure breeding. Methods of crossbreeding. Structure of breeding programs. The course includes three practical lessons, as below:

- Practice 1: Inspection and measuring dimensions of breeding animals
- Practice 2: Evaluate the productivity and quality of livestock products
- Practice 3: Estimation of inbreeding coefficients and genetic relationships among individuals.

Prerequisite course: General Genetics.

36. CN03201. Applied microbiology in animal science (2 credits: 1,5-0,5-4).

This course consists of 5 chapters and 01 project including: Utilize of beneficial microbes on animal feed preservation and processing; Application of beneficial microorganisms on production of microbial products using in livestock production; The role of gastrointestinal tract microbiota and probiotics in livestock production; Contaminated microorganisms in livestock products; Utilize of microbes in livestock waste treatment. Project topics: Processing fermented feed for growing pigs and broilers from available agricultural byproducts.

Prerequisite course: General microbiology

37. CN03302. Animal Feed (2 credits: 1,5-0,5-6).

The course provides the knowledge about the Feed classification; Energy Feed; Protein Feed; Roughage; Principle of using feed additives; Diet formulation for cattle, pig and poultry. The course includes 3 practices: (1) Practice 1: Processing methods of raw foods; (2) Practice 2: Processing method of concentrate feedstuffs; (3) Practice 3: Formulating diets by using software.

38. CN03303. Feed crops (2 credits: 1,5-0,5-6).

This course consists of characteristics of growth and development of feed crops; Some grasses using in livestock; Some legumes using in livestock; Other feed crops using in livestock; Building and managing pastures; Storing/preserving feed crops for animal.

39. CN03304. Principle of HACCP (Hazard Analysis and Critical Control Points and Application in feed manufacturing (2 credits: 2-0-6).

The course provides the knowledge about the concept and principles of the hazard control system in animal feed and food hygiene and safety; HACCP system: concepts, principles and implementation steps applied in the production of animal feed.

40. CN03305. Industrial Feed Technology (2 credits: 2-0-6).

The course includes chapters: Methods of processing raw materials for industrial animal feed production; Factory producing industrial animal feed; Technological process of industrial animal feed production; Material management in industrial animal feed production; Organization of the production of industrial animal feed. The course processes 3 lessons, including: (1) Lesson 1: Check the quality of raw materials, mixed feed for pets; (2) Lesson 2: Surveying the production line of animal feed and designing a model of the production line of industrial animal feed; (3) Lesson 3: Develop a production plan of an industrial feed factory with a scale of 5000 tons/year.

41. CN03306. Feed Quality Evaluation (2 credits: 1,5-0,5-6).

The course provides the knowledge about the Methods for determining the chemical composition and nutritional value of raw materials and animal feeds; Building a product quality control room (KCS) of an animal feed factory; Documents, management system, registration and quality control of animal feed.

42. CN03307. Feed supplements and additives (2 credits: 1,5-0,5-6).

The course provides the knowledge about the Concepts and classification of feed supplements and feed additives; Technology of feed additives; Nutrient feed additives; flavour and pigment sensible feed additives; Feed additives for livestock; Mineral-vitamin premixes manufacturing. The course includes 3 practices: - Practice 1: Evaluation and identification of feed supplements and feed additives. - Practice 2: Calculation of feed supplements to complete feeds - Practice 3: Formulation of mineral-vitamin premixes.

43. CN03308. Nutritional Disorders in Animals (2 credits: 2-0-6).

The course provides the knowledge about Some diseases caused by lack and excess of nutrients; Mycotoxins in animal feed; Heavy metals in animal feed and drinking water; A number of harmful substances in animal feeds with plant and animal origin; Some metabolic diseases in domestic animals; Control food and limit some diseases caused by nutrition.

44. CN03501. Pig Production (3 credits: 2-1-9).

The course consists of the general introduction of pig production in Vietnam and 8 theory chapters: Origin and behaviour of pigs; Pig breeds and breeding management; Pig nutrient requirement and feed; Pig housing; Boar production; Sow production; Piglet production; Growing-finishing pig production. The course has 3 practical lessons: (1) Lesson 1: Pig diet formulation (or Pig feed processing); (2) Lesson 2: Pig housing requirement determination and evaluation; (3) Lesson 3: Evaluation of carcass characteristic and meat quality (or planning to establish a commercial pig farm).

Prerequisite course: Animal breeding

45. CN03502. Cattle and Buffalo production (3 credits: 2-1-9).

Overview of domestic and world cattle and buffalo production; breeds and breeding program; nutrition and feed. Housing and management of cattle waste; Techniques for breeding, calf raising, beef cattle production, dairy cattle production and draft cattle and buffalo production. The course includes three practices: (1) Practice 1: Formulating diets for beef and dairy cattle; (2) Practice 2: Evaluating housing facilities, animal production procedures, and body condition of cattle; (3) Practice 3: Evaluating milk quality.

Prerequisite course: Animal breeding

46. CN03503. Poultry production (3 credits: 2-1-9)

The course includes chapters: Physiological characteristics of poultry; Breeds and breeding management; Productivity of Poultry; Nutrition and feed for poultry; Artificial incubation of eggs; Housing and livestock equipment; Techniques for raising chickens. The course has 5 practical exercises, including: (1) Lesson 1: Evaluate the quality of poultry eggs; (2) Lesson 2: Evaluate the quality of poultry meat; (3) Lesson 3: Surveying the housing; (4) Lesson 4: Formulating chicken diets; (5) Lesson 5: Chicken farm planning exercise.

Prerequisite course: Animal breeding

47. CN03504. Goat and rabbit production ((2 credits: 1,5-0,5-6).

This course includes chapters: Overview of domestic and world goat and rabbit production; Breeds and breeding program; Nutrition and feed; Housing and management of goat and rabbit waste; Techniques for breeding of goats and rabbits at different stages. The course includes three practices: - Practice 1: Formulating diets for goat - Practice 2: Evaluating housing facilities and animal production procedures - Practice 3: Rabbit survey surgery

48. CN03509. Livestock waste management (2 credits: 1,5-0,5-6).

The course includes the following chapters: General situation of animal waste production, Management of solid waste, Management of liquid waste, Management of odour and gas waste, Cleaner production in animal husbandry. Students have to conduct the projects with one of following topics: (1) Trial to raise earthworm for animal waste treatment; (2) Trial to grow aquatic plants to treat liquid waste from animal farms; (3) Trial to compost animal manure by different methods; (4) + Trial to use different microbiological products to treat animal waste.

49. CN03510. Agrarian systems (2 credits:1,5-0,5-6).

This course includes the following chapters: Role, perspective in the development of agrarian systems in the world and in Vietnam; General system theory; Dynamics of agrarian systems in the world and in Vietnam; Household and household production systems; Diagnosis and development of agrarian systems. Students have to conduct the projects with one of following topics: (1) Formulate and improve a livestock production system at household level (poultry, pigs, cattle); (2) Formulate and improve an integrated agricultural production system (VAC, VA, VC, AC) at the household level.

50. CN03802. Vocational practice of animal production 1 (1 credits: 0-1-3).

The course provides the practicing of taking care processes for breeding boars; Sows reproduce at different stages; Piglets from birth to weaning and porker; Practicing breeding techniques; Procedures for disease prevention and disease prevention; Treatments for common diseases in pigs.

51. CN04806. Vocational Practice of Feed Production (3 credits: 0-3-9).

This course provides students a vocational training program at a pig/cattle/ goat or poultry farm on following topics: Livestock feed production planning and management; Implement all of the feed production procedures at farm; Feed quality assessment; and evaluate the impact of animal feed on the productivity of livestock at the farm.

52. CN04813. Animal Production Internship 1 (10 credits: 0-10-30).

The course includes the practical content at the farms as follows: General information about the pig farms, breeding program, pig production program for each stage, farm facilities and animal health management, product consumption status, and calculating economic efficiency of the farm; advantages, disadvantages and development strategies of the farms.

Parallel course: Pig Production.

53. CN04814. Animal Production Internship 2 (10 credits: 0-10-30).

Students are trained and supported to fully understand the course objectives and expected outcomes before going to do practices at ruminant/poultry farms according to the outline approved by the department; At the end of the internship, students submit their reports and attend an interview for final assessment.

Parallel courses: Cattle and Buffalo production or Poultry production

54. CN04815. Internship on Feed production (10 credits: 0-10-30).

During internship time, learners will identify and evaluate the materials and animal feed; Participate in all activities related to the manufacturing and processing of animal feed, as well as the evaluation of its quality and efficiency.

Parallel course: Industrial Feed Technology

55. CN04997. Graduation Thesis (10 credits: 0 – 10 – 30).

In this course, the lecturer discusses with students to find out the research topic, set up a research plan, and conduct experiments at the laboratory or in the animal farm. Students can choose one of the two following options: (1) Animal production and health or (2) Animal nutrition and Feed technology. At the end of this course, students are guided by the lecturer to write a research report and defend their thesis in front of the faculty committee.

Prerequisite course: Animal production Internship 1

56. KQ03107. Basic of Marketing 1 (2 credits: 2-0-6).

Overview of marketing; customer behavior and target market; product strategy; price strategy; distribution strategy; mixed promotion strategy.

57. KT03031. Project Management (3 credits: 3-0-6).

The course provides students with basic concepts of the project managements, project preparation management, project implementation management and post-project management.

58. TS03710. General Aquaculture (2 credits: 1.5-0.5-6).

The course provides the knowledge about the Basic concepts of aquaculture; Fish biology; Aquaculture water quality management; Fish nutrients; Fish breeding and culture techniques; Aquaculture disease treatment.

59. TY03011. Veterinary parasitology I (2 credits: 1.5-0.5-6).

This course helps students understand basic principles about parasitology including parasites, hosts, how parasites enter the hosts, and the impacts of parasites on host. Student will master the basic knowledge about the disease: morphology, life cycle, epidemiology, pathogenesis, symptoms and lesion. After that, students can diagnose methods and measures to prevent some parasites related diseases in cattle, pigs and poultry.

60. TY03014. Veterinary Hygiene 1 (2 credits: 1,5-0,5-6).

The course provides the knowledge about the Scientific principles of air, water and soil sanitation in animal husbandry, cattle and poultry slaughtering and food processing of animal origin products for the purpose of protecting animal health, disease prevention, food pollution reduction. The scientific principles of cleaning barns, health care, slaughtering hygiene.

61. TY03034. Introduction to Veterinary Medicine (2 credits: 1,5-0,5-6).

The course introduces basic knowledge about the disease causes, pathogenesis, methods of examination, diagnosis and treatment of some internal diseases, obstetrical diseases, infectious diseases and parasitic diseases in animals

62. TY03035. Veterinary Diagnosis and Veterinary Internal Medicine (2 credits: 1,5-0,5-6).

This course provides basic knowledge about methods for diagnoses: observation, palpation, knocking, hearing organs inside the body. It also provides basic knowledge about treatment, finding the pathological characters, the causes, symptoms, and treatment for internal diseases in specific organs.

63. TY3036. Veterinary Pharmacology and Toxicology (2 credits: 1,5-0,5-6).

This course provides the scientific basis of interaction between drug/toxin and animal's body, factors that effect the drug use and of toxin. The special section introduces psychoactive drugs, anti-inflammation drugs, disinfectants and antiseptics, antibiotics, antiparasitic drugs. Toxins derived from plant protection products; inorganic are taught.

64. TY03051. Veterinary Infectious Diseases 1 (2 credits: 1,5-0,5-6).

The course provides the knowledge about the Prevention of infectious diseases; infectious disease between animals and humans; Infectious disease of ruminant species; Infectious diseases of pigs and infectious diseases of poultry. Practice diagnosis of some common infectious diseases in cattle and poultry.

65. TY03053. Veterinary Reproduction 1 (2 credits: 1,5-0,5-6).

The course provides the knowledge about the Cattle reproduction 1 includes contents related to animal reproduction. The module describes the biological nature of sexual reproduction, physiological mechanisms that regulate sexual reproduction, maturity in mammals. Reproductive activity of male and female animals, physiology of fertilization, reproductive hormones and their application in animal husbandry - veterinary. Artificial insemination of animal, embryo transfer technology and generalization of sex control in animal reproduction.

66. TY03062. Vocational Practice of Veterinary (2 credits: 2-0-6).

The course provides the knowledge about the Treatment for animal. Students need to know method approach, how to prescribe, create medical records for cattle, how to use veterinary equipment and schedule vaccination; Examination of cattle is essential to make the first diagnosis; Treatment such as injection, infusion ...; Surgery for specific cases of cattle. The course has 6 practical exercises, including: (1) Lesson 1: Prescriptions, medical records for

animal, how to use vaccines; (2) Lesson 2: How to approach animal, how to fix animal; (3) Lesson 3: Take medical through the digestive tract; (4) Lesson 4: Intramuscular injection, subcutaneous injection for animal; (5) Lesson 5: Intravenous infusion for animal; (6) Lesson 6: Introduction to stitches, how to tie knots in surgical surgery, and castration methods for animal.

DEAN OF FACULTY

(Signed)

Assoc. Prof. Dr. Pham Kim Dang

Hanoi, 25 July 2020

PRESIDENT

(Signed)

Prof. Dr. Pham Van Cuong

APPENDIX 1. FACILITIES

Laboratories and experiment equipment

No	Lab	Unit in charge	Location of lab	Surface (m ²)	Equipment
1	Central Lab 1	FAS	Room 101	48	<ul style="list-style-type: none"> ● Drying cabinet ● Fiber analyzer 200 ● Automatic Nitrogen Distillation ● Kjeldahl Automatic Nitrogen Distillation System ● Crusher machine ● Magnetic stirrer ● Grain crusher machine ● Furnace ● Dry block Kjeldahl digestion ● Labortechnik mbH shaker ● Soxhlet extractor systems ● Magnetic stirrer ● Centrifuge Machine ● Hermostatic shaker ● Ultrasonic wash tank ● Suction cabinet toxic ● Drying cabinet ● BINDER Drying cabinet ● Zanntek Analytical ● Evaporator ● Vortex ● Furnace ● Suction cabinet toxic ● Soxhlet extractor systems ● Automatic Nitrogen Distillation (Behr) ● Aurora Water purifier ● Analytical balance 0.001g ● Automatic Burette ● Pouch welding machine ● Suction cabinet toxic ● Technical balance ● Double Distilled Water Machine ● Electric stove ● Disperser 5 -50 ml ● Automatic Burette 50ml ● AnKom Fiber analyzer
2	Central Lab 2	FAS	102	24	<ul style="list-style-type: none"> ● Spectro 2000 ● HERMLER Z200A Centrifuge Machine ● Rapid environmental analyl systems

No	Lab	Unit in charge	Location of lab	Surface (m ²)	Equipment
					<ul style="list-style-type: none"> • Led photographic microscope • Sample centrifuge concentrator • Bomb calorimeter • Culture cabinet • UPLC Systems • CO2 incubator • Computer of AAS Systems) • Computer of UPLC Systems) • Stereo microscope • Spectro 2000 • Hydrua vaporization system • Detector of HPLC machine • Atomic absorption spectroscopy • Luminometer • Automatic polarimeter system • Analytical balance • Conductivity meter • CO2 Monitoring equipment • Vortex • Analytical balance 0.0001 g • Stereo microscope • pH meters
2	Central Lab 3	FAS	103		<ul style="list-style-type: none"> • Fiber analyzer 200 • ELISA reader • Solvent evaporation system • Technical balance • Hand-held refractometer
4	Practical Room	Department of Animal Nutrition and Feed Technology	109	48	<ul style="list-style-type: none"> • Incubator MINNEERT • UE300 - 39l" • Biosafety cabinet • Light microscope • Vertical Autoclaves • Multi gas detector • Incubator • Analytical balance 10-2 • Infrared cooktop • UV-Vis spectrophotometers
4	Comp. Room 2	Department of Animal Nutrition and Feed Technology	111	20	<ul style="list-style-type: none"> • 17 personal computers • Projector

No	Lab	Unit in charge	Location of lab	Surface (m ²)	Equipment
5	Practical Room	Department of Animal Nutrition and Feed Technology	112	40	<ul style="list-style-type: none"> • Fume Hoods • Air circulation heating oven • Centrifugal Mill • Automatic block digestion unit • Kjeldahl Nitrogen analyzer • Magnetic stirrers/Mixing • Total Dietary Fibre Analyzer • Electrically heated muffle furnace • Electric stove • KJELDATHERM® block digestion unit • Digital BURETTE • pH meter • moisture balance • Analytical balance 10-4 • Freeze Dryer • grinding machine • Electric stove
6	Practical Room	Department of Biology and Zoology	201	48	<ul style="list-style-type: none"> • Multi-function Biological Microscope • Benchtop pH meter • stereo microscope • stereo microscope • Cold centrifuge • Drying oven • Incubator • Magnetic Stirrer • Vacuum system • Vortex mixer • deep freezer • Analytical balance • Television microscope • Laboratory water bath • Water distillation machine • Automatic burette • Dispensette 5 -50ml • Automatic burette • Dispensette 5 -50ml
7	Practical Room	Department of Biology and Zoology	203	24	<ul style="list-style-type: none"> • Nikon microscope
8	Practical Room	Department of Biology	204	24	<ul style="list-style-type: none"> • Sample storage refrigerator • Microscope cabinet

No	Lab	Unit in charge	Location of lab	Surface (m ²)	Equipment
		and Zoology			
9	Animal Products Lab	Department of Animal Breeding and Genetics	208	24	<ul style="list-style-type: none"> • Water Activity Meter • Color Reader • MECMESIN Digital Force Gauges • Meat pH meter • pH meter • Water Bath • microscope • Photometer SDM • electrophoresis equipment • pH meter • Egg Quality • Air Condition • The linearly perfect scanner • Ultrasound system • Electronic weighing system
10	Computer Room 1	Department of Animal Breeding and Genetics	209	48	<ul style="list-style-type: none"> • 30 personal computers • Projector
	Practical Room	Department of Animal Breeding and Genetics	212	50	<ul style="list-style-type: none"> • pH meter • Analytical balance • Vortex
12	Genetic Lab	Department of Animal Breeding and Genetics	303	50	<ul style="list-style-type: none"> • Water Bath • Laminar airflow cabinet • Biosafety cabinet • magnetic stirrer • magnetic stirrer (included temperature) • Moisture Balance • refrigerated centrifuge • uv-vis spectrophotometer • Autoclave machine • Dehumidifiers • analytical balance • centrifuge system • Manual gel documentation system • Real-time PCR System • Water Bath • Gel Electrophoresis Equipment

No	Lab	Unit in charge	Location of lab	Surface (m ²)	Equipment
					<ul style="list-style-type: none"> ● electrophoresis equipment ● electrophoresis equipment ● magnetic stirrer ● Air Gel Drying Heating System ● Programmable Thermal Controller ● Transilluminator UV and Visible ● gel documentation system ● Electrophoresis Power Supply ● pH meter ● Electrophoresis Power Supply ● Vortex mixer ● Pipet 5000µl ● Pipet 1000µl ● Pipet 200µl ● Pipet 20µl ● Pipet 2.5µl ● PCR Machine Gradient
13	Practical Room	Department of Animal Breeding and Genetics	302	48	<ul style="list-style-type: none"> ● refrigerator and freezer ● Gas measuring equipment ● Refrigerator
14	Practical Room 1	Department of Specialized Animal Production	306	48	<ul style="list-style-type: none"> ● EKOMILK-M milk composition analyzer
15	Animal Production Lab 2	Department of Specialized Animal Production	307	24	<ul style="list-style-type: none"> ● 2-eye microscope ● Compass ● Gas sampling equipment ● METTLER pH meter ● Analysis scales with readability: 0.0001 g ● Technical scales with readability: 0.001 g ● Digital Automatic Burette ● HERMLER Z200A centrifuge ● HEIDOLPH Magnetic stirrer without heating ● Pregnancy Detector for pigs ● RENCO Backfat Tester

No	Lab	Unit in charge	Location of lab	Surface (m ²)	Equipment
					<ul style="list-style-type: none"> ● PREG ALERT PRO ultrasound scanner ● Estrous Detector for cows ● Mastitis detector ● Spectrophotometer for water analysis ● Atmospheric pressure gauge ● Wind speed meter ● METTLER PB 303 Technical scale ● Cattle weighing scale ● Drying cabinet ● Distilled water machine
16	Practical Room	Department of Specialized Animal Production	308	24	<ul style="list-style-type: none"> ● Technical scales ● COD analytical equipment set ● BOD analytical equipment set ● Hoa Phat Freezer
17	Practical Room	Department of Animal Physiology and Behaviour	309	64	<ul style="list-style-type: none"> ● 2 eyes microscope ● 2 eyes microscope ● 2 eyes microscope ● stereomicroscope ● stereomicroscope ● microscope use natural light ● Labomed microscope ● Centrifuge ● pH meter ● Analytical balance ● Quick check machine number sperm dose ● Vortex ● veterinary electrocardiograph

APPENDIX 2
A MATRIX OF PROGRAM OBJECTIVES AND EXPECTED LEARNING
OUTCOMES FOR BACHELOR OF ANIMAL SCIENCE

Program Objectives (POs)

First few years after graduation, the graduates can:

PO1: Specialised skills and professional attitude

Work as technical consultants, extensionists, business people and managers in livestock production with ethical and professional manners.

PO2: Development of livestock sector and international integration

Pursue lifelong learning and scientific research to create knowledge and solutions for livestock production in the era of global integration.

PO3: Social responsibilities

Perform animal production techniques and health care for sustainable development of livestock production with whole hearted responsibility.

Blocks	ELOS	PO1	PO2	PO3
General knowledge	1	x	x	
Professional knowledge	2	x		
	3	x		
	4	x		
General skills	5	x	x	
	6	x	x	
	7	x	x	
Professional skills	8	x	x	
	9	x		
	10	x	x	
	11	x		
Attitude	12	x		x
	13	x		x
	14		x	

APPENDIX 3

BENCHMARK OF EXPECTED LEARNING OUTCOMES OF BACHELOR OF ANIMAL SCIENCE PROGRAM OF VIETNAM NATIONAL UNIVERSITY (VNUA), CAN THO UNIVERSITY (CTU) VIETNAM, WAGENINGEN UNIVERSITY (WUR), NETHERLANDS AND IOWA STATE UNIVERSITY (ISU) - USA

ELOs	EXPECTED LEARNING OUTCOMES (VNUA)	CTU	WUR	ISU
ELO 1	Apply the general knowledge of natural and social sciences and the understanding of contemporary issues to the field of livestock production	A, B	A	1
ELO 2	Analyze factors affecting the animal breed production, nutrition, and animal health	E	B	2
ELO 3	Evaluate the efficiency of animal breed production, nutrition and animal health	H, I	B	2
ELO 4	Design livestock production programs to ensure sustainable development	K	F	4
ELO 5	Apply effectively creative and critical thinking, and problem-solved skills to scientific research and professional practice	F	G	8
ELO 6	Coordinate teamwork in professional activities to achieve objectives as a member or a manager	L	H, J	7
ELO 7	Communicate effectively using multimedia, adapt well in multi-cultural environment; meet the required standards of English proficiency issued by Ministry of Education and Training	C, N	I	9, 8
ELO 8	Use effectively the skills of surveying, collecting and processing data to serve scientific research, technology development and management of livestock production	F, M	C, E	5, 2
ELO 9	Apply appropriate techniques, technologies and systems in sustainable livestock production		D	3
ELO 10	Utilize information technology and modern equipment in livestock industry to serve production and business to achieve objectives.	D, O	C	3
ELO 11	Perform properly the basic and intensive technical procedure in livestock production	J		
ELO 12	Comply with state law and specific regulations and professional ethics	P, Q	J	
ELO 13	Demonstrate responsibility to protect the environment, public health and respect animal welfare	P		4
ELO 14	Perform the habits of life-long learning		J	6

**EXPECTED LEARNING OUTCOMES (ELOS) OF BACHELOR
OF ANIMAL SCIENCE PROGRAM OF CAN THO UNIVERSITY (CTU)**

https://www.ctu.edu.vn/ctdt/k40/58_CDR_52620105_ChanNuoi.pdf

Completing the training program students have the following knowledge, skills and attitudes:

2.1 Knowledge

2.1.1 General knowledge

- A. Understand a basic knowledge of Marxism - Leninism; guidelines and policies of the Communist Party of Vietnam, Ho Chi Minh ideology; have a good health and knowledge of defense education to meet the requirements of national construction and defense.
- B. Have a basic knowledge of general law, social sciences and humanities, natural sciences (chemistry and biology) to meet the requirements of acquiring professional education knowledge.
- C. Have a basic knowledge of English/ French equivalent to National **B** level.
- D. Have a basic knowledge of computers, Microsoft office software and other basic software.

2.1.2 Basic knowledge

- E. Master a basic knowledge of animal production and health such as physiology, nutrition, genetics, microbiology, immunity and animal pathology.
- F. Have a knowledge of agricultural scientific research methods in animal production and health.
- G. Knowledge of animal husbandry laws.

2.1.3. Specialized knowledge

- H. Master a specialized knowledge on breeding, feed, technical care procedure, prevention and treatment procedure and management in livestock production.
- I. Have a knowledge of veterinary practice skills.

2.2 Skills

2.2.1 Hard skills

- J. Apply and practice effectively technical care procedure, prevention and treatment procedure in animal production.
- K. Manage of livestock farms, production and business company in the field of animal production.

2.2.2 Soft skills

- L. Have a working method, analyze and solve problems arising in the practice of livestock production, have a thinking and reasoning skills; have the ability to self-study, work independently or in groups.
- M. Participate or lead a research proposal, programs and projects on animal production and health and other related fields.
- N. Communicate basically in English or French. Read and understand specialized documents in English or French.
- O. Use office software such as Word, Excel, Power-point, use the Internet.

2.3 Attitude

- P. Have a sense of civic responsibility, right professional attitude and ethics.
- Q. Have a sense of discipline and professional manners.

**EXPECTED LEARNING OUTCOMES (ELOs) OF BACHELOR
IN ANIMAL SCIENCE PROGRAM OF WAGENINGEN (WUR) – NETHERLANDS**
Handbook 2016/2017 (wur.nl)

After successful completion of this BSc program graduates are expected to be able to:

- A. explain the biological functioning of animals in relation to their environment, both at a fundamental level and in the various purposes of animals for human use and well-being;
- B. critically evaluate the concepts, approaches and methodologies of the various disciplinary domains within animal (terrestrial and aquatic) sciences including breeding, health, behaviour and nutrition;
- C. apply (chemical) laboratory techniques, mathematical and statistical methods for the collection and analyses of experimental data in animal sciences, and to evaluate their suitability for addressing specific research questions;
- D. make judgements on the sustainable development of animal (terrestrial or aquatic) systems, based on the knowledge of the (bio-) technological, ecological, socio-economic and ethical context;
- E. demonstrate a scientific approach by the ability to retrieve and select relevant literature from bibliographic databases and understand the process of testing hypotheses through experimental evidence;
- F. integrate the acquired disciplinary knowledge to obtain healthy animals in a safe environment for food and non-food functions; as well as identify gaps in his/her knowledge and to review and acquire new knowledge in response;
- G. design and conduct (under supervision) a short research project, either by executing an in vivo experiment or by collecting and reviewing (literature) data;
- H. work in a team of students to perform a small project within the context of a course;
- I. communicate the results of a research project to a (semi-) professional audience, both verbally and in writing, in Dutch, and if relevant, in English;
- J. reflect (under supervision) individually or in group sessions upon their personal knowledge, skills and attitude, and design and plan a learning path.

**EXPECTED LEARNING OUTCOMES (ELOS) OF BACHELOR
IN ANIMAL SCIENCE PROGRAM OF IOWA STATE (ISU) USA**

Iowa State University – 2016-2017 (iastate.edu)

After successful completion of this BSc program graduates are expected to be able to:

- (1) to be able to explain the symbiotic relationship of animals and humans.
- (2) to contribute to the solution of complex problems of animal enterprise management.
- (3) to apply their knowledge and skills in a technically demanding global community.
- (4) to be knowledgeable about sustainable animal production practices that also ensure animal health and well-being and stewardship of natural resources.
- (5) to gather and integrate information to solve problems.
- (6) to become self-learners.
- (7) to become leaders team builders.
- (8) to become aware of domestic and global issues driving changes in the animal industries.
- (9) to develop effective communication skills.

APPENDIX 4

A MATRIX OF COURSES AND EXPECTED LEARNING OUTCOMES

Note: I – Introduction; P – Practice; R – Reinforce; M – Master

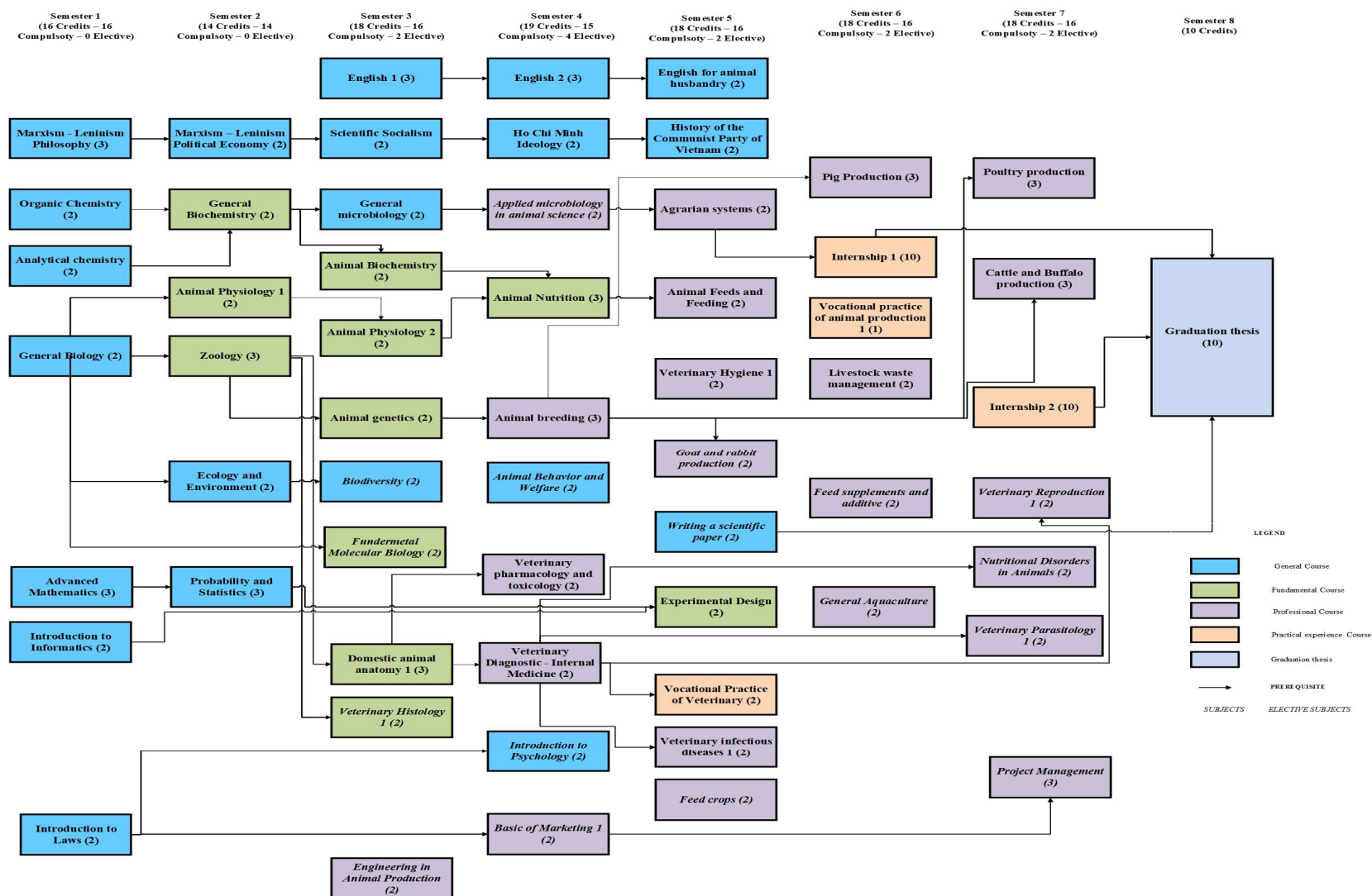
No	Semester	Code	Name of course	Expected Learning Outcomes													
				1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1	ML01009	Introduction to Laws					I	I	I					I		
2	1	TH01011	Advanced Mathematics	P				I									
3	1	SH01001	General Biology	I				I							I		
4	1	ML01020	Philosophy of Marxism and Leninism	I				I							I		
5	1	MT01002	Organic Chemistry	I				I	I						I		
6	1	TH01009	Introduction to Informatics					I		I	I		I				
7	1	MT01004	Analytical chemistry	I				I							I		
8	2	ML01021	Marxism - Leninism political Economy	P				I							I		I
9	2	TH01007	Probability and Statistics	R				I									
10	2	MT01008	Ecology and Environment	P				I	I	I						I	
11	2	CN02101	Zoology	R	I			I	I						I	I	
12	2	CN02301	General Biochemistry	P	I			I	I						I		
13	2	CN02303	Animal Physiology 1		P			I							I		
14	3	SN01032	English I					I	I	I							
15	3	ML01022	Scientific Socialism	R				P							P		
16	3	CN01103	Biodiversity	M				P	P						P	R	
17	3	CN01201	General microbiology	M	I			P							P		
18	3	CN02302	Animal Biochemistry	R	P			P	P						P		
19	3	TY02001	Domestic animal anatomy 1		P			I									
20	3	TY02003	Veterinary Histology 1		R			I							P		
21	3	CN02305	Animal Physiology 2		R			P							I	I	
22	3	CN02501	Animal genetics	M	R	I			P				I		P		

No	Semester	Code	Name of course	Expected Learning Outcomes													
				1	2	3	4	5	6	7	8	9	10	11	12	13	14
23	3	SH01006	Fundamental Molecular Biology		R								I		P		
24	3	CD03204	Engineering in Animal Production						I	P			P		I		
25	4	SN01016	Introduction to Psychology					I	I	I							
26	4	CN01203	Animal Behavior and Welfare		P			I							P	P	
27	4	ML01005	Ho Chi Minh Ideology	R					P	P					I		
28	4	SN01033	English 2					P	P	P							
29	4	CN02601	Animal Nutrition		M	I		P							P		
30	4	KQ03107	Basic of Marketing 1						P	P							
31	4	CN03101	Animal breeding		M	P		P					P		R		
32	4	CN03201	Applied microbiology in animal science		M		I		P	P					P		I
33	4	TY03036	Veterinary pharmacology and Toxicology						P	P					P	P	
34	4	TY03035	Vet. Diagnosis and Internal Medicine		R	I		R							P	P	
35	5	CD03434	Livestock Feed Processing Equipment			I			P	P			R		P		
36	5	ML01023	The history of Vietnamese Communist Party	M				P							P		
37	5	CN01302	Writing a scientific paper					P	R	R					P		
38	5	CN02701	Experimental Design	M				R		R	R	R	R		P		
39	5	SN03049	English for animal husbandry					P	P	P							
40	5	CN03302	Animal Feeds and Feeding			P	I	R	R	R							R
41	5	CN03510	Agrarian systems	M			R	M			P	R					P
42	5	TY03051	Veterinary infectious diseases 1		M	P		P								R	
43	5	CN03504	Goat and rabbit production			R		P		P							
44	5	TY03062	Vocational Practice of Veterinary			P	I		R			P		I	P	M	
45	5	TY03014	Veterinary Hygiene 1		M	P			P						P		
46	5	TY03034	Introduction to Veterinary Medicine		P	I		P								P	
47	5	CN03306	Feed Quality Evaluation		M	P				P		I				P	

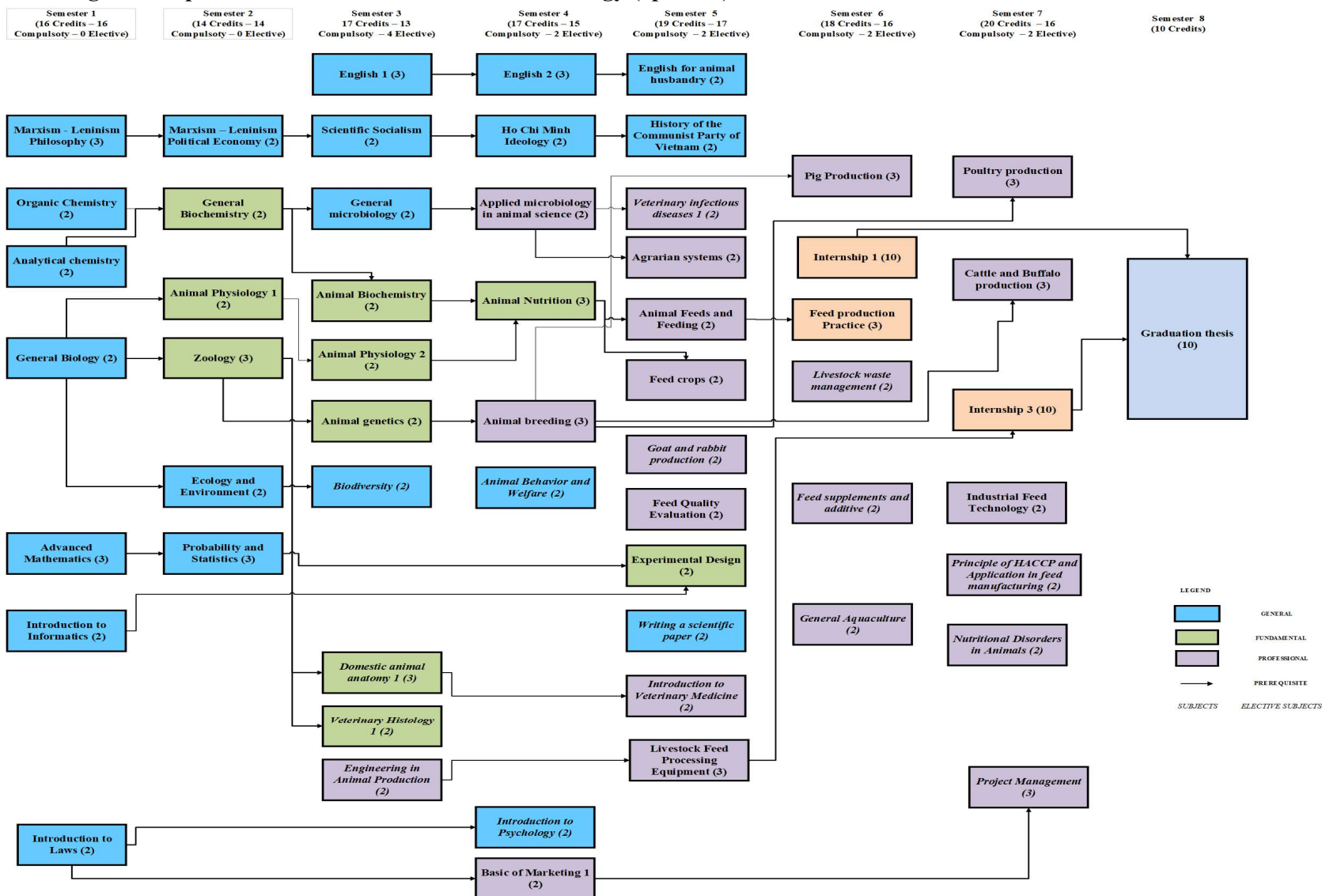
No	Semester	Code	Name of course	Expected Learning Outcomes													
				1	2	3	4	5	6	7	8	9	10	11	12	13	14
48	5	CN03303	Feed crops			P	I		P	P					P		I
49	6	TS03710	General Aquaculture					I	I								
50	6	CN04813	Animal production Internship 1			M	R		M		R	R		R	R		
51	6	CN03501	Pig Production			R	I	R					M	I	P		
52	6	CN03509	Livestock waste management		R		R	P				R		R			P
53	6	CN03307	Feed supplements and additive			R			P				R		R		
54	6	CN03802	Vocational practice of animal production 1				P		R			P		P	R		
55	6	CN04806	Vocational Practice of Feed Production				P	P	R			P		R	R		
56	7	CN03503	Poultry production			R	I		R				M	P	P		
57	7	CN03502	Cattle and Buffalo production			R	I		R				M	P	P		
58	7	CN03308	Nutritional Disorders in Animals		M	R				P					P		
59	7	KT03031	Project Management						R	R							
60	7	TY03053	Veterinary Reproduction 1		M												
61	7	TY03011	Veterinary parasitology		M			P									
62	7	CN04814	Animal production Internship 2			M	R	M	M	M	R	R		R	R		
63	7	CN03304	Principle of HACCP and Application in feed manufacturing			R				P					P		
64	7	CN04815	Internship on Feed production				R	M	M		R	R		R	R		M
65	7	CN03305	Industrial Feed Technology		P			P	P	P			M		P		
66	8	CN04997	Graduation thesis				M	M		M	M	M	M	M			M

APPENDIX 5: LEARNING ROADMAP

1. Learning roadmap of Animal production and health (option 1)



2. Learning roadmap of Animal nutrition and Feed Technology (option 2)



APPENDIX 6. TRAINING PROGRAM IMPROVEMENT

(APH: Animal production and health, ANF: Animal nutrition and Feed technology; CR: credits)

Academic year	Improvement level	Program duration	Number of credits	Program improvement	Reason
2016-2017	Minor changes at the course level	4 years	APH: 129 ANF: 128	Annual update of course contents according to the regulations of VNUA, improvement of teaching and assessment methods	Continuous improvement of the program
2017-2018	Major changes at the program level	4 years	130	<p>Formulation of new ELOs and improvement of the program based on stakeholder opinions and results of DACUM workshop:</p> <ul style="list-style-type: none"> - Increasing the number of internship credits from eight CR: Vocational Practice of Animal Production (1 CR for option 1), Vocational Practice of Veterinary (1 CR for option 1), Vocational Practice of Feed Production (2 CR for option 2), Internship 1 (3 CR), Internship 2 (3 CR for option 1), Internship 3 (3 CR for option 10) to 23 CR: Vocational Practice of Animal Production (1 CR), Veterinary Vocational Practice of Veterinary (2 CR), Vocational Practice of Feed Production (3 CR for option 2). Internship 1 (10 CR), Internship 2 (10 CR for option 1), Internship 3 (10 CR for option 2). - Project Management was added (3 CR) as an elective course. - For each option, some courses were removed from the General knowledge (APH: General Chemistry (2CR), AFN: General Chemistry (2CR) and Molecular Biology 1 (2TC)). - Some courses (9-10 CR) were moved from compulsory to elective: - <i>For both options:</i> 	<p>Improvements of the program content to accommodate DACUM competencies and the new ELOs:</p> <ul style="list-style-type: none"> - Priority of the program was given to practical skill improvement rather than solely focusing on academic theory education - Course were added due to their contribution to the ELOs - The courses were removed due to their lower contribution to the ELOs - Some courses were moved from compulsory to elective due to increasing practical credits, decreasing theoretical credits. - Increase the number of credits of the program up to 130 to unify the two options

				1. Psychology (2 CR) 2. Histology (2 CR) - <i>For APH:</i> 1. Molecular Biology 1 (2 CR) 2. Veterinary Parasitology (2 CR) 3. Animal Reproduction 1 (2 CR) - <i>For ANF:</i> 1. Domestic Animal Anatomy (3 CR) 2. Principle of HACCP and Application in Feed Manufacturing (2 CR)	
2018-2019	Minor changes at the course level	4 years	130	- Annual update of course contents according to the regulations of VNUA, improvement of teaching and assessment methods: - Apply e-learning	Continuous improvement of the program
2019-2020	Minor changes at the course level	4 years	131	Annual update of course contents according to the regulations of VNUA, improvement of teaching and assessment methods: - Implementing the project-based teaching method for courses: Animal Waste Management, Agrarian Systems, Applied Microbiology in Animal Production, Forage and Fodder Crops - 1 CR was increased to the politics courses - Renamed a course “Molecular Biology 1” to “General Molecular Biology - Teaching online by MS Teams	- Continuous improvement of the program - Increasing 1 CR of the politics courses was according to the MOET regulations
2020-2021	Minor changes at the course level	4 years	131	Annual update of course contents according to the regulations of VNUA, improvement of teaching and assessment methods: - Teaching and assessment online by MS Teams	- Continuous improvement of the program