

**SPECIFICATION PROGRAM
BACHELOR OF FOOD TECHNOLOGY (BFT)**

Program title: Food Technology

Option 1: Food Technology

Option 2: Food Safety and Quality Management

Program code: 7540101

Type of program: full-time

Program duration: 4 years

Total required credits: 131

Degree name: Bachelor of Food Technology

Awarding institution: Vietnam National University of Agriculture

1. Program objectives and expected learning outcomes:

1.1. Program objectives (PO)

In the early years after graduation, graduates are able to:

PO1: Develop, consult, invest and manage production and business, food testing and quality control units in a professional and ethical manner;

PO2: Identify and solve new practical issues and contribute to the advancements of the food technology industry;

PO3: Pursue lifelong learning to improve their self-development abilities and career development to become leaders, managers and experts, fulfil social responsibilities and contribute to global sustainable development.

1.2. Expected learning outcomes (ELOs)

After completing the programme, graduates are able to:	
General knowledge	ELO1: Apply knowledge of scientific basics, social sciences and humanities in career and life
Professional knowledge	ELO2: Apply food science knowledge in food research, production, and development
	ELO3: Analyze effects of technical factors in the production lines to ensure and improve food product quality
	ELO4: Evaluate food production technologies in accordance with the economic, social and environmental requirements of Vietnam and the world
	ELO5: Develop food production systems, programs and quality assurance systems in accordance with national and international standards
General skills	ELO6: Work effectively in the group as a team member or a leader to achieve the goals
	ELO7: Communicate effectively using multimedia and in multicultural environment; Obtain English standard as prescribed by the Ministry of Education and Training
	ELO8: Use effectively information technology and modern equipment in food management, production and trading activities
Professional skills	ELO9: Apply critical thinking to effectively solve research, technology and management issues in the food industry
	ELO10: Apply skills in data collection and analysis for scientific research and surveys on practical food production issues
	ELO11: Analyze quality and safety of raw food materials, in-processing food products and final food products
	ELO12: Calculate technological parameters to select appropriate machines and equipment for economic efficiencies in food production
	ELO13: Operate procedures of food production and quality control.
Ethics and Attitudes	ELO14: Demonstrate start-up spirit of and lifelong learning motivation
	ELO15: Perform social responsibilities, demonstrate respects for professional ethics and comply with food production laws and regulations

2. Career prospects

After completing the BFT, graduates are able to work in the following positions:

- Staff in quality control, quality assurance, food products research and development, managers at food factories.
- Managers, consultants for food production companies and food exporting companies.
- Researchers at institutes, universities in food inspection, nutrition, post-harvest technology, food technology.

3. Postgraduate study opportunities

Graduates are able to continue to study master, doctoral programs at a national or international university in the field of food technology, post-harvest technology, processing technology of agricultural products and aquatic products, human nutrition...

4. Admission to the program

*** *For Vietnamese applicants:***

Applicants have graduated from high school and are admitted by 03 methods: (1) Direct admission; (2) Admission based on high school results; and (3) Admission based on the results of national entrance exams

*** *For international applicants:***

International applicants graduated from high school submit academic transcripts and study expectation to the International cooperation Office. The International cooperation Office will be responsible for contacting with the Faculty and Training Management Office for approval.

5. Educational philosophy and Teaching and learning strategies

- ***Educational philosophy***

Consistent with the Vision, Mission, and Educational Philosophy of Vietnam National University of Agriculture and Faculty, the BFT pursues the philosophy of "**constructivism**". The philosophy is implemented based on the following 2 principles:

1. Principle 1: reflective learning: the passion for knowledge is developed through practical experiences

2. Principle 2: The new knowledge is developed on old knowledge and experience. The students are guided in the way of self-learning via various interactions and constructive activities.

- ***Teaching and learning strategies***

Determine the appropriate training scale, improve training quality, meet the demands of the labor market in the context of extensive international integration.

Develop the expected learning outcome based on social needs, from which to develop and improve the program.

Regularly improve teaching methods based on student as center and apply active teaching methods.

Enhance the role of businesses and alumni in the development and training of the program

Strengthen domestic and foreign cooperation to maximize resources for training.

6. Assessment methods

1. Student assessment is designed based on constructive alignment with the expected learning outcomes.

2. Assessment methods include formative assessments during learning process: presentation, assignment, mid-term assessment and final exam, project.

3. The final assessment of the training program includes: assessment of internship and graduation thesis

7. Regulation of assessment and academic standards

Overall score of the course is calculated on a 10-point scale and converted into a 4-point scale system and the alphabet system points according to the university's regulations

Grade transfer system:

No.	10-scale marks	4- scale marks		Pass/Fail	Classification
		Equivalent in letter	Marks		
1	From 8,5 to 10	A	4,0	Pass	High distinction
2	From 8,0 to 8,4	B+	3,5	Pass	Distinction
3	From 7,0 to 7,9	B	3,0	Pass	Credit
4	From 6,5 to 6,9	C+	2,5	Pass	Credit
5	From 5,5 to 6,4	C	2,0	Pass	Pass
6	From 5,0 to 5,4	D+	1,5	Pass	Pass
7	From 4,0 to 4,9	D	1,0	Conditional Pass	Conditional Pass
8	Below 4,0	F	0	Fail	Fail

Summary of Degree classification

No.	Cumulative GPA	Graduation ranking
1	3,60 – 4,00	Outstanding
2	3,20 - 3,59	Excellent
3	2,50 - 3,19	Credit
4	2,00 - 2,49	Pass
5	< 2,00	Fail

Training process:

The program is taught in 8 main semesters of 4 years. The maximum time for study is 6 academic years.

Students accumulate 131 credits of the BFT including 41 general credits, 20 fundamental credits, 70 specialized credits (58 compulsory credits, 12 elective credits).

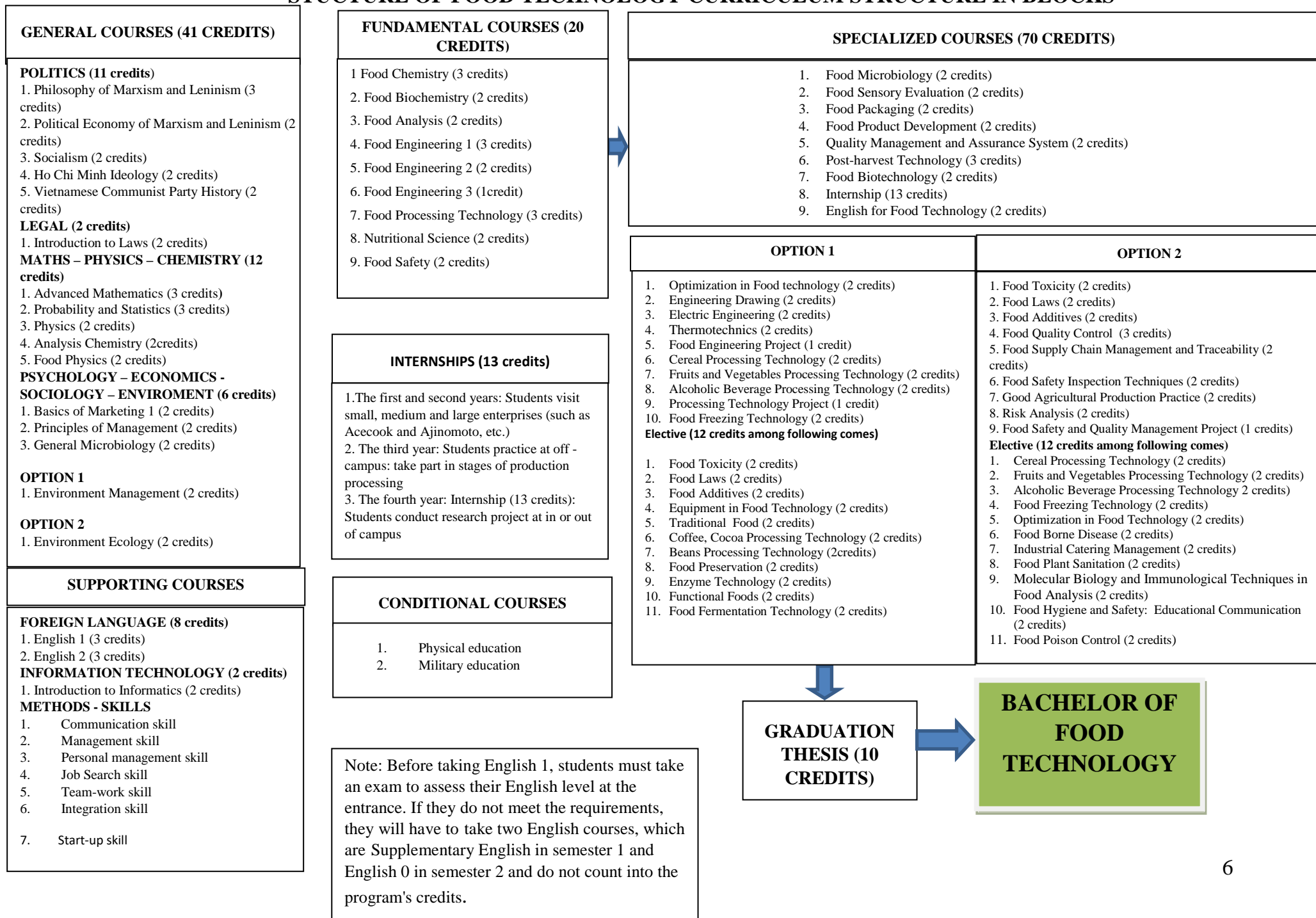
Students complete 3 physical education credits, 11 defense education credits, 3 soft skills credits.

Graduation conditions:

Students are eligible to graduate when accumulating 131 credits of the program; the cumulative GPA of the entire course is $\geq 2,00$; Obtaining English standard as prescribed by the Ministry of Education and Training; achieving physical education and citizen military certificates (grades of physical and citizen military courses do not count to the cumulative GPA); obtaining a soft skills certificate.

8. Program Structure and Content

STRUCTURE OF FOOD TECHNOLOGY CURRICULUM STRUCTURE IN BLOCKS



Curriculum content

Note: BB= Compulsory; TC = Elective

No	Year	Course code	Course name	Option 1				Option 2				Prerequisite course/ parallel course	Code of prerequisite course/ parallel course
				Total credits	Theory	Practice	Compulsory /Elective	Total credits	Theory	Practice	Compulsory /Elective		
GENERAL COURSES				41	39	2		41	39	2			
1	1	ML01020	Philosophy of marxism and Leninism	3	3	0	BB	3	3	0	BB		
2	1	ML01021	Political economy of marxism and leninism	2	2	0	BB	2	2	0	BB		
3	1	TH01011	Advanced mathematics	3	3	0	BB	3	3	0	BB		
4	1	ML01009	Introduction to Laws	2	2	0	BB	2	2	0	BB		
5	1	KQ03212	Principles of Management 1	2	1,5	0,5	BB	2	1,5	0,5	BB		
6	1	TH01018	Physics	2	2	0	BB	2	2	0	BB		
7	1	TH01009	Introduction to informatics	2	1,5	0,5	BB	2	1,5	0,5	BB		
8	1	TH01007	Probability and Statistics	3	3	0	BB	3	3	0	BB		
9	1	MT01004	Analytical Chemistry	2	1,5	0,5	BB	2	1,5	0,5	BB		
10	1	CP02001	Food Physics	2	2	0	BB	2	2	0	BB		
11	1	KQ03107	Basics of Marketing 1	2	2	0	BB	2	2	0	BB		
12	1	CP02008	General Microbiology	2	1,5	0,5	BB	2	1,5	0,5	BB		
13	2	ML01022	Socialism	2	2	0	BB	2	2	0	BB		
14	2	ML01005	Ho Chi Minh ideology	2	2	0	BB	2	2	0	BB		
15	2	MT02011	Environmental Management	2	2	0	BB						

No	Year	Course code	Course name	Option 1				Option 2				Prerequisite course/ parallel course	Code of prerequisite course/ parallel
16	2	MT01008	Ecology and Enviroment					2	2	0	BB		
17	2	SN01032	English 1	3	3	0	BB	3	3	0	BB	English 0	SN00011
18	3	SN01033	English 2	3	3	0	BB	3	3	0	BB	English 1	SN01032
19	3	ML01023	Vietnamese Communist Party History	2	2	0	BB	2	2	0	BB		
FUNDEMENTAL COURSES				20	17.5	2,5		20	17.5	2,5			
20	1	CP02004	Food Chemistry	3	2	1	BB	3	2	1	BB		
21	1	CP02006	Nutrition	2	1,5	0,5	BB	2	1,5	0,5	BB	Food Chemistry	CP02004
22	2	CP02014	Food Biochemistry	2	2	0	BB	2	2	0	BB		
23	2	CP02015	Food Engineering 1	3	3	0	BB	3	3	0	BB		
24	2	CP02016	Food Engineering 2	2	2	0	BB	2	2	0	BB		
25	2	CP02017	Food Engineering 3	1	1	0	BB	1	1	0	BB		
26	2	CP02018	Food Processing Technology	3	3	0	BB	3	3	0	BB		
27	3(CN1), 2(CN2)	MT02040	Food Analysics	2	1,5	0,5	BB	2	1,5	0,5	BB		
28	3	CP02007	Food Safety	2	1,5	0,5	BB	2	1,5	0,5	BB	General Microbiology	CP02008
SPECIALIZED COURSES				70	36.5	33.5		70	36,5	33,5			
29	2	CP03007	Food Microbiology	2	1,5	0,5	BB	2	1,5	0,5	BB		
30	2	CP03003	Postharvest handling of agricultural products	3	2,5	0,5	BB	3	2,5	0,5	BB		
31	2	CP03014 (CN1)	Optimization in food technology	2	2	0	BB						
32	2	CD00006 (CN1)	Engineering drawing	2	2	0	BB						
33	2	CD02611 (CN1)	Electric Engineering	2	2	0	BB						
34	2	CD02301 (CN1)	Thermotechnics	2	2	0	BB						
35	2	CP02021 (CN1)	Food engineering project	1	1	0	BB						
36	3 (CN1), 2(CN2)	CP03004	Food biotechnology	2	1,5	0,5	BB	2	1,5	0,5	BB	General Microbiology	CP02008

No	Year	Course code	Course name	Option 1				Option 2				Prerequisite course/ parallel course	Code of prerequisite course/ parallel
37	3	CP03006	Food Sensory evaluation	2	1	1	BB	2	1	1	BB		
38	3	CP03039	Food Packaging	2	1,5	0,5	BB	2	1,5	0,5	BB	Postharvest handling of agricultural products	CP03003
39	4(CN1), 3(CN2)	CP03001	Management System and Quality Assurance	2	2	0	BB	2	2	0	BB	Food Microbiology	CP03007
40	3	CP03078	Vocational training	13	0	13	BB	13	0	13	BB		
41	3	CP03034	Food Toxicology	2	2	0	TC	2	2	0	BB		
42	3	CP03022	Food Additives	2	1,5	0,5	TC	2	1,5	0,5	BB		
43	3	CP03057	Fruits and Vegetables Processing Technology	2	1,5	0,5	BB	2	1,5	0,5	TC	Food Engineering 3	CP02017
44	3	CP03021	Meat Processing Technology	2	1,5	0,5	TC	2	1,5	0,5	TC	Food Chemistry	CP02004
45	3	CP03020	Tea Processing Technology	2	1,5	0,5	TC	2	1,5	0,5	TC	Food Engineering 3	CP02017
46	3	CP02019 (CN1)	Project on Food Processing Technology	1	1	0	BB					Food Processing Technology	CP02018
47	4	SN03022	English for Food science and Technology	2	2	0	BB	2	2	0	BB		
48	4	CP03052	Food Product Development	2	1,5	0,5	BB	2	1,5	0,5	BB	Food Engineering 3	CP02017
49	4(CN1), 2(CN2)	CP03023	Food Legislation	2	1	1	TC	2	1	1	BB		
50	4(CN1), 3(CN2)	CP03056	Cereal Processing Technology	2	1,5	0,5	BB	2	1,5	0,5	TC	Food Engineering 3	CP02017
51	3(CN1), 4(CN2)	CP03028	Alcoholic beverages Processing Technology	2	1,5	0,5	BB	2	1,5	0,5	TC	Food Engineering 3	CP02017
52	4	CP03019	Technology for processing vegetable oil	2	1,5	0,5	TC	2	1,5	0,5	TC	Food Engineering 3	CP02017
53	4(CN1), 3(CN2)	CP03054	Confectionery Processing Technology	2	1,5	0,5	TC	2	1,5	0,5	TC	Food Engineering 3	CP02017

No	Year	Course code	Course name	Option 1				Option 2				Prerequisite course/ parallel course	Code of prerequisite course/ parallel
54	4	CP03058	Milk Processing technology	2	1,5	0,5	TC	2	1,5	0,5	TC	Food Engineering 3	CP02017
55	4	CP03009	Food Freezing Technology	2	1,5	0,5	BB						
56	4	CP04998	Thesis	10	0	10	BB	10	0	10	BB	Internship Food Analytics	CP03078 MT02040
57	4	CD03433	Food technology Equipment	2	1,5	0,5	TC						
58	3	CP03002	Traditional Food	2	1,5	0,5	TC						
59	3	CP03011	Bean processing technology	2	1,5	0,5	TC						
60	3	CP03016	Food storage	2	1,5	0,5	TC					Food Chemistry	CP02004
61	4	CP03018	Coffee, cacao processing technology	2	1,5	0,5	TC					Food Engineering 3	CP02017
62	4	CP03029	Enzyme technology	2	2	0	TC						
63	3	CP03030	Functional Foods	2	1,5	0,5	TC						
64	4	CP03035	Food Fermentation Technology	2	1,5	0,5	TC					Food Microbiology	CP03007
65	2	CP03026	Food Testing					3	2,5	0,5	BB		
66	3	CP03050	Food supply chain management and traceability					2	2	0	BB	Postharvest handling of agricultural products	CP03003
67	4	CP03051	Inspection Techniques in Food safety					2	1	1	BB		
68	4	CP03065	Good Agricultural Practices					2	1,5	0,5	BB		

No	Year	Course code	Course name	Option 1				Option 2				Prerequisite course/ parallel course	Code of prerequisite course/ parallel
69	4	CP02012	Risk analysis					2	2	0	BB	Food Safety	CP02007
70	4	CP03025	Project on Quality Management					1	1	0	BB		
71	3	CP03066	Food borne disease					2	1,5	0,5	TC	General Microbiology	CP02008
72	3	CP03067	Industrial catering management					2	1,5	0,5	TC	Postharvest handling of agricultural products	CP03003
73	4	CP03015	Food plant sanitation					2	1,5	0,5	TC		
74	4	CP03068	Molecular Biological Methods in Food Analysis					2	2	0	TC		
75	4	CP03070	Food Safety and Hygiene: Communication and education					2	1,5	0,5	TC	Food Safety	CP02007
76	4	CP03071	Foodborne Illness Outbreak Management					2	1,5	0,5	TC	Food Safety	CP02007

Total of credits of the Curriculum

General knowledge	<i>41 credits: 41 Compulsory credits</i>
Foundation knowledge	<i>20 credits: 20 Compulsory credits</i>
Professional knowledge	<i>47 credits: 35 Compulsory credits + 12/32 Elective credits</i>
Thesis and Internship	23 credits
Total credits	131

** Foreign language support (students must obtain 2 credits)*

Course code	Course name	Credits	Course status
SN00010	Pre English	1	Elective
SN00011	English 0	2	Elective

** 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
KN01007	Start – up skill	2	Elective

** Courses of physical and defense education (GDTC)*

Module title	Course code	Course name	Credits	Course status
General physical	GT01016	General physical courses	1	Elective
	GT01017	Physical courses (Choose 2 among 9 courses: Athletics, Aerobics, Soccer/ Football, Volleyball, Basketball, Badminton, Chess, Dance sport, Swimming)	1	Elective
	GT01018			
	GT01019			
	GT01020			
	GT01021			
	GT01022			
	GT01023			
	GT01014			
GT01015				
Citizen Military courses	QS01011	Guidelines for National Defense and Security of Vietnam Communist Party	3	Elective
	QS01012	Defence warker – security	2	Elective
	QS01013	General Military Strategies and Techniques for using shotguns and grenades	2	Elective
	QS01014	General knowledge of Services and Arms in the VPA	4	Elective
Total			14	

9. Study plan (scheduled)

Note: BB= Compulsory; TC = Elective

1st year

Semester	Course code	Course name	Option 1				Option 2				Code of prerequisite course
			Total credits	Theory	Practice	Compulsory /Elective	Total credits	Theory	Practice	Compulsory /Elective	
1	TH01011	Advanced mathematics	3	3	0	C	3	3	0	C	
1	ML01009	Introduction to Laws	2	2	0	C	2	2	0	C	
1	KQ03212	Principles of Management 1	2	1,5	0,5	C	2	1,5	0,5	C	
1	TH01018	Physics	2	2	0	C	2	2	0	C	
1	ML01020	Philosophy of marxism and Leninism	3	3	0	C	3	3	0	C	
1	TH01009	Introduction to informatics	2	1,5	0,5	C	2	1,5	0,5	C	
1	MT01004	Analytical Chemistry	2	1,5	0,5	C	2	1,5	0,5	C	
1	QS01011	Guidelines for National Defense and Security of Vietnam Communist Party	3	3	0	Supporting	3	3	0	Supporting	
1	QS01012	Defence worker – security	2	2	0	Supporting	2	2	0	Supporting	
1	QS01013	General Military Strategies and Techniques for using shotguns and grenades	2	1	1	Supporting	2	1	1	Supporting	
1	QS01014	General knowledge of Services and Arms in the VPA	4	0,3	3,7	Supporting	4	0,3	3,7	Supporting	
1	SN00010	Pre English	1	1	0	-	1	1	0	-	
1	GT01016	General physical courses	1	0,5	0,5	Supporting	1	0,5	0,5	Supporting	
2	GT01017	Physical education (choose 2 of 9 courses: Athletics, Aerobic Gymnastics, Football, Volleyball, Basketball, Badminton, Chess, Dance sport, Swimming)	1	0	1	Supporting	1	0	1	Supporting	
	GT01018										
	GT01019										
	GT01020										
	GT01021										
	GT01022										
	GT01023										
GT01014											
GT01015											
2	KN01001	Soft skills: 90 class hours (choose 3 of 7 courses, each course has 30 class hours: Communication skills, Leadership Skills, Self Management Skills, Job Search Skills, Teamwork Skills, Intergrated Skills, Startup skills)	1	0	1	Supporting	1	0	1	Supporting	
	KN01002										
	KN01003										
	KN01004										
	KN01005										
	KN01006										
	KN01007										
2	SN00011	English 0	2	2	0	-	2	2	0	-	
2	CP02004	Food Chemistry	3	2	1	C	3	2	1	C	
2	ML01021	Political economy of marxism and leninism	2	2	0	C	2	2	0	C	
2	TH01007	Probability and Statistics	3	3	0	C	3	3	0	C	
2	CP02008	General Microbiology	2	1,5	0,5	C	2	1,5	0,5	C	
2	CP02001	Food Physics	2	2	0	C	2	2	0	C	
2	CP02006	Nutrition	2	1,5	0,5	C	2	1,5	0,5	C	CP02004
2	KQ03107	Basics of Marketing 1	2	2	0	C	2	2	0	C	
Total credits of compulsory courses			32	28,5	3,5		32	28,5	3,5		
Total credits of elective courses			0	0	0		0	0	0		
Total credits of physical and defense education			14	6,8	7,2		14	6,8	7,2		
Total credits of informatics courses			2	1,5	0,5		2	1,5	0,5		
Total credits of soft skills			3	0	3		3	0	3		

2nd year

Semester	Course code	Course name	Option 1				Option 2				Code of prerequisite course
			Total credits	Theory	Practice	Compulsory /Elective	Total credits	Theory	Practice	Compulsory /Elective	
3	CP03007	Food Microbiology	2	1,5	0,5	C	2	1,5	0,5	C	
3	CD02301	Thermotechnics	2	2	0	C	-	-	-	-	
3	ML01022	Socialism	2	2	0	C	2	2	0	C	
3	MT02040	Food Analytics	-	-	-	-	2	1,5	0,5	C	
3	CD00006	Engineering drawing	2	2	0	C	-	-	-	-	
3	MT01008	Ecology and Environment	-	-	-	-	2	2	0	C	
3	CP02015	Food Engineering 1	3	3	0	C	3	3	0	C	
3	CP02016	Food Engineering 2	2	2	0	C	2	2	0	C	
3	CP02017	Food Engineering 3	1	1	0	C	1	1	0	C	
3	CP02014	Food Biochemistry	2	2	0	C	2	2	0	C	
3	MT02011	Environmental Management	2	2	0	C	-	-	-	-	
4	SN01032	English 1	3	3	0	C	3	3	0	C	SN00011
4	ML01005	Ho Chi Minh ideology	2	2	0	C	2	2	0	C	
4	CP02021	Food engineering project	1	1	0	C	-	-	-	-	
4	CD02611	Electric Engineering	2	2	0	C	-	-	-	-	
4	CP02018	Food Processing Technology	3	3	0	C	3	3	0	C	
4	CP03014	Optimization in food technology	2	2	0	C	-	-	-	-	
4	CP03003	Postharvest handling	3	2,5	0,5	C	3	2,5	0,5	C	
4	CP03004	Food biotechnology	-	-	-	-	2	1,5	0,5	C	CP02008
4	CP03026	Food Testing	-	-	-	-	3	2,5	0,5	C	
Total credits of compulsory courses			34	33	1		32	29,5	2,5		
Total credits of elective courses			0	0	0		0	0	0		
Total credits of physical and defense education			0	0	0		0	0	0		
Total credits of informatics courses			0	0	0		0	0	0		
Total credits of soft skills			0	0	0		0	0	0		

3rd year

Semester	Course code	Course name	Option 1				Option 2				Code of prerequisite course
			Total credits	Theory	Practice	Compulsory /Elective	Total credits	Theory	Practice	Compulsory /Elective	
5	CP02007	Food Safety	2	1,5	0,5	C	2	1,5	0,5	C	CP02008
5	CP03078	Internship	13	0	13	C	13	0	13	C	
5	CP03056	Cereal Processing Technology	-	-	-	-	2	1,5	0,5	E	CP02017
5	CP03057	Fruits and Vegetables Processing Technology	2	1,5	0,5	C	2	1,5	0,5	E	CP02017
5	CP03021	Meat Processing Technology	-	-	-	-	2	1,5	0,5	E	CP02004
6	ML01023	Vietnamese Communist Party History	2	2	0	C	2	2	0	C	
6	SN01033	English 2	3	3	0	C	3	3	0	C	SN01032
6	CP03006	Food Sensory evaluation	2	1	1	C	2	1	1	C	
6	CP03001	Management System and Quality Assurance	-	-	-	-	2	2	0	C	CP03007
6	CP03028	Alcoholic beverages	2	1,5	0,5	C	-	-	-	-	CP02017
6	CP02019	Project on Food Processing Technology	1	1	0	C	-	-	-	-	CP02018
6	CP03004	Food biotechnology	2	1,5	0,5	C	-	-	-	-	CP02008
6	MT02040	Food Analyisics	2	1,5	0,5	C					
6	CP03050	Food supply chain management and traceability	-	-	-	-	2	2	0	C	CP03003
6	CP03039	Food Packaging	2	1,5	0,5	C	2	1,5	0,5	C	CP03003
6	CP03034	Food Toxicology	2	2	0	E	2	2	0	C	
6	CP03011	Bean processing technology	2	1,5	0,5	E	-	-	-	-	
6	CP03002	Traditional Food	2	1,5	0,5	E	-	-	-	-	
6	CP03022	Food Additives	2	1,5	0,5	E	2	1,5	0,5	C	
6	CP03030	Functional Foods	2	1,5	0,5	E					
6	CP03016	Food storage	2	1,5	0,5	E					CP02004
6	CP03020	Tea Processing Technology	2	1,5	0,5	E	2	1,5	0,5	E	CP02017
6	CP03021	Meat Processing Technology	2	1,5	0,5	E	-	-	-	-	CP02004
6	CP03054	Confectionery Processing Technology	-	-	-	-	2	1,5	0,5	E	CP02017
6	CP03066	Food borne disease	-	-	-	-	2	1,5	0,5	E	CP02008
6	CP03067	Industrial catering management	-	-	-	-	2	1,5	0,5	E	CP03003
Total credits of compulsory courses			33	16	17		32	16,5	16,5		
Total credits of elective courses			16	12,5	3,5		14	10,5	3,5		
Total credits of physical and defense education			0	0	0		0	0	0		
Total credits of informatics courses			0	0	0		0	0	0		
Total credits of soft skills			0	0	0		0	0	0		

4th year

Semester	Course code	Course name	Option 1				Option 2				Code of prerequisite course
			Total credits	Theory	Practice	Compulsory /Elective	Total credits	Theory	Practice	Compulsory /Elective	
7	SN03022	English for Food science and Technology	2	2	0	C	2	2	0	C	
7	CP03001	Management System and Quality Assurance	2	2	0	C	-	-	-	-	CP03007
7	CP03056	Cereal Processing Technology	2	1,5	0,5	C	-	-	-	-	CP02017
7	CP03052	Food Product Development	2	1,5	0,5	C	2	1,5	0,5	C	CP02017
7	CP03009	Food Freezing Technology	2	1,5	0,5	C	-	-	-	-	
7	CP03051	Inspection Techniques in Food safety	-	-	-	-	2	1	1	C	
7	CP03025	Project on Quality Management	-	-	-	-	1	1	0	C	
7	CP02012	Risk analysis	-	-	-	-	2	2	0	C	CP02007
7	CP03054	Confectionery Processing Technology	2	1,5	0,5	E	-	-	-	-	CP02017
7	CP03018	Coffee, cacao processing technology	2	1,5	0,5	E	-	-	-	-	CP02017
7	CP03023	Food Legislation	2	1	1	E	2	1	1	C	
7	CP03029	Enzyme technology	2	2	0	E	-	-	-	-	
7	CD03433	Food technology Equipment	2	1,5	0,5	E	-	-	-	-	
7	CP03065	Good Agricultural Practices	-	-	-	-	2	1,5	0,5	C	
7	CP03058	Milk Processing technology	2	1,5	0,5	E	2	1,5	0,5	E	CP02017
7	CP03035	Food Fermentation Technology	2	1,5	0,5	E	-	-	-	-	CP03007
7	CP03015	Food plant sanitation	-	-	-	-	2	1,5	0,5	E	
7	CP03068	Molecular Biological Methods in Food Analysis	-	-	-	-	2	2	0	E	
7	CP03070	Food Safety and Hygiene: Communication and education	-	-	-	-	2	1,5	0,5	E	CP02007
7	CP03071	Foodborne Illness Outbreak Management	-	-	-	-	2	1,5	0,5	E	CP02007
7	CP03028	Alcoholic beverages	-	-	-	-	2	1,5	0,5	E	CP02017
7	CP03019	Technology for processing	2	1,5	0,5	E	2	1,5	0,5	E	CP02017
8	CP04998	Thesis	10	0	10	C	10	0	10	C	CP03078, MT02040
Total credits of compulsory courses			20	8,5	11,5		23	10	13		
Total credits of elective courses			16	12	4		14	11	3		
Total credits of physical and defense education			0	0	0		0	0	0		
Total credits of informatics courses			0	0	0		0	0	0		
Total credits of soft skills			0	0	0		0	0	0		

10. Course content and workload

10.1. General courses

1. CP02001. Food physics (2 credits: 2-0-6): Introduce the basic concepts in food physics; Mass and energy balance; Mass transfer in food industry; Food rheology; Heat transfer in food industry, Optical properties of food, Surface properties of food.

2. CP02008. General microbiology (2 credits: 1.5-0.5-6). This course includes: History, general characteristics and role of microorganisms; Group of prokaryotes; Group of eukaryotes; Non-cellular life - virus; Metabolism of microorganisms; Growth and development of microorganisms; Factors affecting growth and development of microorganisms.

3. KQ03107. Basics of Marketing 1 (2 credits: 2-0-6). Overview of marketing; Information systems and marketing reseachs; Marketing environment; Customer behavior reseachs; Market segmentation, target market selection and commodity positioning; Product strategy; Price strategy; Place strategy; Promotion strategy; Marketing organizational structure.

4. KQ03212. Principles of Management 1 (2 credits: 2-0-6). Overview of Management and Management Theories; Managers and Entepreneurs and Leaders; Managerial Information and Decision; Planning; Organizing; Leading; Controlling.

5. ML01020. Philosophy of marxism and Leninism. (3 Credit Hours: 3 – 0 – 9). The course is consist of the following content: Chapter 1: Outline of Philosophy and Marxism - Leninism philosophical school; Chapter 2: Dialectical Materialism ; Chapter 3: Historical Materialism

6. ML01021. Political economy of marxism and leninism (2 credits: 2–0–6) The course is consist 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.

7. ML01022. 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 Democarcy 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.

8. ML01023. Vietnamese Communist Party History (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.

9. 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.

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

11. 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.

12. MT01008. Ecology and Environment (2 credits: 2-0-6). The course introduces general concepts of ecology: populations, communities, ecosystem. Basic concepts of environment, resources, and pollution. Natural resources in reality: forest, soil, water, ocean and sea, atmosphere, mineral, energy. Main principles in sustainable exploitation of natural resources. The relationship between natural resources, environment and development.

13. MT02011 - Environmental Management (2 credits: 2-0-6). The environmental Management course consists 6 chapters and provides learners with the basis of Environmental management including objectives, contents, trends, and scientific foundations of environmental management to understand the government's management system on the environmental protection. This course also analyzes a number of legal, economic, technical and other tools for the environmental management that applied for urban, industrial, and rural areas.

14. SN00010. Pre English (1 credits: 1-0-3). Picture Descriptions; Question & Responses; Short conversations & Short talk; Reading Comprehension; Revision.

15. SN00011. English 0 (2 credits: 2-0-6). Hello everybody!, Meeting people, The world of work, Take it easy!, Practice test.

16. 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. *Prerequisite course: SN00011 - English 0.*

17. 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: SN00032 - English 1.*

18. TH01007. Probability and Statistics (3 credits: 3–0– 9). This course consists of seven chapters: Descriptive statistics; Probability; Random variable; Sampling distributions; Estimation; Hypothesis testing; Simple linear regression model.

19. TH01009. Introduction to Informatics (2 credits: 1.5 – 0.5 – 6). The course consists of seven 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.

20. TH01011. Advanced Mathematics (3 credits: 3-0-9). Matrix – Determinant – System of linear equations; Differential calculus of functions of single variable; Differential calculus of functions of multiple variables; Integral calculus of functions of single variable; Differential equation.

21. TH01018. Physics (2 credits: 2–0–6). The course covers the following contents: Unit measurement and unit conversion system, Mechanics, Thermal, Electrical and Magnetic, Wave optics, Atomic and nuclear physics.

10.2. Fundamental courses

22. CP02004. Food Chemistry (3 credits: 2-1-9). This course consists of both theory and practice. The theoretical section introduces structure, nutrition, sensory value and functional properties of the basic components of food including water, protein, glucid, lipid, pigment, aromatic compounds and toxic. The practical section includes practice lessons on analyzing some ingredients of food such as water, protein, pigments as well as changing during food (lipid).

23. CP02006. Nutrition. (2 credits: 1.5–0.5–6). This course covers: The role and needs of nutrients; Digestion and absorption of nutrients; Nutrition, illness and community health; Nutrition for different groups of people; Methods of assessment of

nutritional status; Functional food; Food security; *Parallel course: CP02004 - Food Chemistry*

24. CP02007. Food safety (2 credits: 1.5-0.5-6). This course **includes:** Food poisoning caused by biological agents. Food poisoning caused by chemical agents: Toxins are formed and contagious by technical cultivation; contamination of agricultural products and foods during storage; food poisoning during processing. Food poisoning caused by physical agents; Techniques for food safety and quality control.

25. CP02014. Food biochemistry (2 credits: 2-0-6). The course introduces enzymes, important biological catalysts involved in almost all of biochemical metabolic processes in food raw materials and food processing; the metabolism of key compounds such as protein, carbohydrate, lipid in living organisms/food; and important biochemical changes in some raw materials and food products.

26. CP02015. Food Engineering 1 (3 credits: 3-0-9). Introduction; Fluid flow in food processing; Heat transfer in food processing; Basic engineering principles and equipment of preservation process (pasteurization, sterilization); Basic engineering principles and equipment of food refrigeration and freezing; Basic engineering principles and equipment of size reduction process (cutting, grinding, milling, homogenization); Basic engineering principles and equipment of separation process (sedimentation, filtration, centrifugation); Basic engineering principles and equipment of mixing and forming.

27. CP02016. Food engineering 2 (2 Credits: 2-0-6). Introduction; Technological and equipment aspects of distillation process; Technological and equipment aspects of solid - liquid extraction process; Technological and equipment aspects of adsorption and ion exchange process; Technological and equipment aspects of evaporation process; Technological and equipment aspects of drying process; Technological and equipment aspects of crystallization process.

28. CP02017. Food engineering 3 (1 credit: 1-0-3). Introduction; Technological and equipment aspects of fermentation process; Technological and equipment aspects of enzymatic process.

29. CP02018. Food Processing Technology (3 credits: 3-0-9). This course covers the characteristics of food and theory in food processing; Prepare raw materials; Make small size; The process of mixing and shaping; Separation and concentration of food ingredients; Fermentation and enzyme technology; Blanching; Pasteurization, sterilization by heat; Evaporation and distillation; Extruded; Drying; Roast and grill; Fried; Direct and indirect heat processing; Freeze; Freeze drying; Coating; Packaging; Raw material management, product storage and distribution.

10.3. Specialized courses

- 30. CD00006. Descriptive Geometry and Engineering Drawing (2 credits: 2-0-6).** Point, line, plane; Methods of projection; Methods of projection transformation; Line and plane. Standards for engineering drawing presentation; Geometric drawing; Object representation; Axonometric projection; Conventional representations of threads and joints; Conventional representations of gears and springs; Tolerance and surface roughness; Detail drawing; Assembly drawing; Diagram.
- 31. CD02611. Electrical Engineering (2 credits: 2-0-6).** Basic concepts of electric circuits; Single phase sinusoidal alternating current (AC) circuits; Three-phase sinusoidal alternating current (AC) circuits; General concept of electric machines; Transformers; Asynchronous electric machines; Direct current (DC) electric machines; Electrical instruments for control of electric machines, electric equipment.
- 32. CD02301. Thermotechnics (2 credits: 2-0-6).** Basic concepts of engineering thermodynamics; Laws of thermodynamics; Vapor and humid air; Fundamentals of heat transfer theory; Steady and unsteady heat transfer.
- 33. CD03433. Equipment in Food Technology (2 credits: 1.5-0.5-6).** Equipment used in size reduction, expression, separation, weighing, mixing, drying, evaporation, packaging, sterilization, pasteurization, and chilling.
- 34. CP02012. Risk analysis (2 credits: 2-0-6).** The course consists of 3 chapters with the following main contents: General introduction; Risk assessment; Risk Management; Risk Communication. *Prerequisite course: CP02007- Food safety*
- 35. CP02019. Project on Food Processing Technology (1 credit : 0-1-2).** This course covers: Introduction. Economic investment argument. Select technological processes and equipments; Product balance calculation; calculation of processing equipment capacity; energy calculation; constructive; economic efficiency. *Prerequisite course: CP02018- Food processing technology.*
- 36. CP02021. Food Engineering Project (1 credit: 1-0-3).** This course guides students to understand contents, requirements to make a food engineering project; Options of project topics related to the field of food technology include: processes and equipment for heat transfer (heating, blanching, pasteurization, sterilization); mass transfer processes and equipment (evaporation, drying); processes and equipment for low temperature processing (chilling, freezing). Students implement project on process and equipment for manufacturing a certain food product.
- 37. CP03001. Management System and Quality Assurance (2 credits: 2-0-6).** The course helps students understand the definitions of food, its constituents and affects food quality and food quality management and inspection activities. Equipping students with techniques for checking statistics in production. Module introduces some international quality management systems such as HACCP, ISO 9000, ISO 22000 and some other quality management programs. *Prerequisite course: CP03007 - Food Microbiology*

38. CP03002. Traditional Food (2 credits: 1.5-0.5-6). This course consists of following contents: Introduction of raw materials, production processes, factors affecting the production of some traditional products, from different sources of raw materials.

39. CP03003. Postharvest handling of agricultural products. (3 credits: 2.5-0.5-9). This course consists of: Factors causes affecting the nutritional quality, sensory quality and shelf life of harvested crop products; Principles and techniques of harvesting, preliminarily processing, preserving and managing the quality of harvested crop products; Post-harvest technology applies to a number of crop product groups.

40. CP03004. Food biotechnology (2credits: 1.5-0.5-6) Food biotechnology means biotechnology for food processing. This course provides knowledge of transgenic plants, and the application of technologies using yeast and products. The course also provides knowledge of the technologies that use bacteria and products, and microbial enzymes in food processing. The course also discusses the application of biotechnology in assessing the quality of food hygiene and safety. *Prerequisite course: CP02008 - General microbiology*

41. CP03006. Food Sensory Evaluation (2 credits: 1-1-6). The course consists of 4 chapters with following content: Sensory quality and food sensory analysis; The mechanism of action of the sensory organs; Sensory tests; Organizing sensory testing.

42. CP03007. Food Microbiology (2 credits: 1.5-0.5-6). This course consists of 5 chapters with the following contents: Food microflora; The fermentation process; The process of decomposing compounds containing nitrogen; The process of biosynthesis of substances with high biological activity by microorganisms; Methods to analyse microbiology in food. The course consists of 3 practical courses with the content: Determining the number of microorganisms in a food sample; Determination of fermentation ability of microorganisms; Determination of protein hydrolyzate and microbial enzyme biosynthesis.

43. CP03009. Refrigeration and Freezing Technology of Food (2 credits: 1.5-0.5-6). Concepts and basic principles of refrigeration. Basic thermodynamics for refrigeration; Principles and equipment of food refrigeration; Principles and equipment of food freezing; Technological parameters and equipment of refrigeration and freezing of food for preservation; Principles, techniques for thawing of frozen food; Processing technology of several frozen food products.

44. CP03011. Bean processing technology (2 credits: 1.5-0.5-6) General introduction of materials; Processing technology of bean-based products include: flour and green bean starch, green bean vermicelli, whole soybean flour, fat-separated soybean flour, concentrated soy protein, isolated soybean protein, structural protein products, soy milk,tempeh, soy sauce and miso.

45. CP03014. Optimization in Food engineering (2credits: 2-0-6). General introduction to food science and technology; Theory of experimental design; Optimal experimental design models in food technology; Application of information technology and optimal processing software in experimental design to optimize problems in the food industry.

46. CP03015. Food plant sanitation (2 credits: 1.5-0.5-6). This course consists of concepts of food plant sanitation; The relationship between biosecurity, microorganisms, allergens and sanitation for food processing; Food contamination sources; Personal hygiene and sanitary food handling; The role of HACCP in sanitation; Cleaning compounds, sanitizers and sanitizing methods; Sanitation equipment; Waste product handling; Pest control; Sanitary design and construction for food processing; Quality assurance for sanitation.

47. CP03016. Food storage (2 credits: 1.5-0.5-6). This course consists of: The concept of food, the importance of food preservation and the status of food preservation in Vietnam; Characteristics of food; Causes of food spoilage and food preservation principles; Food preservation methods; Preservation technology for some main foods.

Prerequisite course: CP02004. Food Chemistry

48. CP03018. Coffee, cacao processing technology (2 credits: 1.5-0.5-6). Raw materials for processing coffee and cocoa; Technology of processing green coffee; Production techniques of roasted and instant coffee; Cocoa technology. *Prerequisite subject: CP02017 - Food engineering 3.*

49. CP03020. Tea processing technology (2 credits: 1.5-0.5-6). General introduction; Raw materials in tea processing; Black tea processing technology; Green tea processing technology; Semi-fermented teas processing technology. *Prerequisite subject: CP02017 - Food engineering 3.*

50. CP03019. Technology for processing vegetable oil (2 credits: 1.5 – 0.5 – 4). This course covers: Chemical vegetable oil; Raw materials for Vegetable oil processing; Technology to exploit vegetable oil; Refined vegetable oil processing; Vegetable oil Quality inspection; Vegetable oil processing. *Prerequisite course: CP02017 - Food Engineering 3.*

51. CP03021. Meat Processing Technology (2 credits: 1.5-0.5-6). Muscle structure and meat composition; Slaughtering and classification of meat; Postmortem biochemistry; Meat storage and processing; Meat Products. *Prerequisite course: CP02004 - Food Chemistry*

52. CP03022. Food additives (2 credits: 1.5-0.5-6). This course introduces concepts, current situation and legal regulations on food additives; Classification, physico-chemical characteristics as well as applications of each group Food additives: Food preservative additives; Additives change the food structure; Additives improve the

organoleptic properties of the food product; Additives support food processing technology and Enzyme used in food processing.

53. CP03023. Food Legistration (2 credits: 1-1-6). General introduction of food legistration; Standardization and Food regulations; Food Safety Administration; The system of legal documents on food safety; Regulations on food safety management; Food legistration in the world.

54. CP03025. Project on Quality Management (1 credit: 1-0-3). This course includes: Technological process of food products; Building a quality management system according to ISO 9001-2008; HACCP planning.

55. CP03026. Food Testing (3 credits: 2.5-0.5-9). This course consists of: Introduction of food testing, the reality of food testing in the world and in Vietnam, challenges in analysis and food testing, safety principles in food analysis and testing; Steps for sampling, sample preparation and conducting sensory tests, testing of microbiological criteria in food, testing of some inorganic and organic ingredients in food.

56. CP03028. Alcoholic beverage processing technology (2 credits: 1.5-0.5-6). Technology for alcohol production; Technology for wine production; Technology for beer production. *Prerequisite course: CP02017- Food Engineering 3*

57. CP03029. Enzyme technology (2 credits: 2-0-6). The course consists of 5 chapters with the following contents: basic characteristics, kinetics, naming, enzyme classification, enzyme activity, separation and purification of enzyme, enzyme immobilization and application of enzymes in foodstuffs to make assurance quality and safe food products.

58. CP03030. Functional food (2 credits: 1.5 – 0.5 – 6). This course covers: Functional food overview; Micronutrients; free radicals and antioxidants; probiotics, prebiotics and synbiotics; Lipids and Functional food; Natural compounds and extraction.

59. CP03034. Food Toxicology (2 credits: 1.5-0.5-6). This course consists of following contents: Journey of toxins in the body: the ways of invading, metabolizing and eliminating toxins; Introduction about the types of toxins formed during the processing and storage of food products, the manifestations of intoxication and preventive measures; Introduction the naturally occurring toxins, available in foods.

60. CP03035. Food Fermentation Technology (2 credits: 1.5-0.5-6). This course includes: Basic principles of fermentation technology; Technology for selection, improvement and preservation of microorganisms; Nutritional requirement and fermentation medium; Characteristics and techniques of fermentation systems; Fermentation equipment; The recovery and purification of fermentation products. Fermentation wastewater treatment. *Prerequisite course: CP03007 Food microbiology.*

61. CP03039. Food Packaging (2 credits: 1.5-0.5-6). This course consists of: classification and functions of food packaging; Distinguishing trade names, goods

labels, trademarks and food brands, regulations on food labeling; Designing labels for food packaging; Characteristics and properties of materials used for food packaging and their applications in packaging; Technologies for packaging and filling solid and liquid foods and specific cases; Methods of sealing food packaging; The impact of waste from food packaging and solutions to limit their harm to the environment. *Prerequisite course: CP03003: Postharvest handling of agricultural products.*

62. CP03050. Food supply chain management and traceability (2 credits: 2-0-6). This course consists of: Supply Chain Management; Food Supply Chain Management; Traceability in Food and agricultural products. *Prerequisite course: CP03003- Postharvest handling of agricultural products.*

63. CP03051. Inspection Techniques in Food safety (2 credits: 1-1-6). This course includes: Mission and Authority of agencies performing food safety inspection; General principles in food safety inspection; Principles of planning and organizing for food safety inspection; Sampling techniques for food safety inspection.

64. CP03052. Food Product Development (2 credits: 1.5-0.5-6). General introduction; The basic knowledge for product development; The consumer in product development; The product development process. *Prerequisite course: CP02017 - Food engineering 3.*

65. CP03054. Confectionery processing technology (2 credits: 1.5-0.5-6). Confectionery classification; Raw materials in confectionery production; Biscuits production technology; Introduction of spice cakes and other types of cakes; Candy production technology. *Prerequisite course: CP02017 - Food engineering 3.*

66. CP03056. Cereal Processing Technology (2 credits: 1.5-0.5-6). Scientific basis of cereals; Starch production; Production of rice and rice products; Production of wheat flour products. *Prerequisite course: CP02017 - Food engineering 3.*

67. CP03057. Fruit and Vegetable Processing Technology (2 credits: 1.5-0.5-6). This course introduces the role of fruit and vegetable in human life, the importance of fruit and vegetable processing in the national economy. Raw materials: general information and quality change during processing. Processing technology that add value to fruits and vegetables include: Canning; Pickling vegetables; Wine making; Freezing. *Prerequisite course: CP02017 - Food engineering 3.*

68. CP03058. Milk Processing Technology (2 credits: 1.5-0.5-6). Milk composition and factors affecting milk quality and yield. Milk processing and Milk products. *Prerequisite course: CP02017 - Food engineering 3.*

69. CP03065. Good Agricultural Practices. (2 credits: 1.5 – 0.5 - 6). This course consists of: importance of good agricultural practices in the agricultural supply chain and standards of good agricultural practices around the world and in Vietnam. Key points in good agricultural practices (GAP) are applied in crop production and in animal husbandry and aquaculture.

70. CP03066. Food borne disease (2 credits: 1,5-0,5-6). This course includes: Relationship between food, pathogens, infection and its impact on public health, economy and society; Foodborne illness caused by viruses; Foodborne illness caused by bacteria; Foodborne illness is caused by protozoa and helminths; Foodborne infections caused by chemical agents; Food contamination monitoring and food-borne disease control. *Prerequisite course: CP02008- General microbiology.*

71. CP03067. Industrial catering management (2 credits: 1.5-0.5-6). This course consists of: The concept of industrial cartering; Conditions of facilities, equipment, tools and people in industrial cartering; Operating industrial cartering: and Food safety and hygiene for industrial cartering. *Prerequisite course: CP03003. Postharvest handling of agricultural products*

72. CP03068. Molecular Biological Methods in Food Analysis (2credits: 2-0-6). Analytical targets of food; Sample preparation and purification methods of analytical targets in food; Molecular biological methods and their application in food analysis: Polymerase Chain Reaction, Realtime PCR, Polymerase Chain Reaction– Restriction fragment Length Polymorphism (PCR-RFLP), Single stranded Conformation Polymorphism(SSCP), Sequencing, Southern blot, Biosensor...; Immunological methods and their application in food analysis: Enzyme-Linked Immuno-Sorbent Assay (ELISA), Lateral Flow Assay (FLA), Real time Biosensor, Immunoblotting.

73. CP03070. Food Safety and Hygiene: Communication and education (2 credits: 1.5-0.5-6). This course consists of: Some general issues about food hygiene and safety, the causes of food pollution; law on information, education and communication on food safety and hygiene; introducing methods and communication skills, solutions to improve the effectiveness of communication and education on food safety and hygiene; some guidelines for practicing food hygiene and safety. *Prerequisite course: CP02007- Food safety .*

74. CP03071. Foodborne Illness Outbreak Management (2 credits: 1.5-0.5-6). This course includes: General introduction; Epidemiological characteristics of food poisoning; Principles of food poisoning control; Monitoring, investigation, statistics of food poisoning. *Prerequisite course: CP02007 - Food safety.*

75. CP03078. Internship (13 credits: 0-13-39). The course includes professional internship activities at enterprises, state management agencies, and organizations in the field of food science and technology.

76. CP04998. Thesis (10 credits: 0-10-30). In the course, students are guided by lecturers to apply the knowledge, experience and scientific research methods obtained in the program to implement a scientific research project or an applied project in the field of food science and technology such as preliminary processing, preservation of agricultural products, processing and food products development, nutrition and public health, food safety and quality management... Finally, the students will be instructed by

the supervisors to write a thesis and defend it in front of an examination board.

Prerequisite subject: CP03078- Internship, MT02040 Food Analysis

77. MT02040. Food Analysis (2 credits: 1,5-0,5-6). This course includes basic knowledge, classification of analysis methods as well as basic steps in instrumental analysis of food, sampling and preparation, spectroscopy methods, methods of extraction

78. SN03022. English for Food Science and Technology (2 credits: 2-0-6). This course includes: Raw material; Expression; Size reduction; Chilling and freezing; Processing by application of heat; Dehydration, Freeze drying and Freeze concentration; Batch and continuous processing; Fermentation, mixing and forming; Packaging

**ON BEHALF OF THE PRESIDENT
VICE PRESIDENT**

(Signed)

Pham Van Cuong

Hà Nội, May 15th, 2018
**ON BEHALF OF THE DEAN
VICE DEAN**

(Signed)

Giang Trung Khoa

APPENDIX 1

MATRIX OF BFT OBJECTIVES AND EXPECTED LEARNING OUTCOMES

Objectives	ELO1	ELO2	ELO3	ELO4	ELO5	ELO6	ELO7	ELO8	ELO9	ELO10	ELO11	ELO12	ELO13	ELO14	ELO15
PO1		✓	✓	✓		✓	✓	✓					✓		✓
PO2		✓	✓	✓	✓				✓	✓	✓	✓		✓	✓
PO3	✓	✓							✓	✓				✓	✓

APPENDIX 2

ALIGNMENT BETWEEN ELOs OF BFT WITH REFERENCE PROGRAMS OF DOMESTIC AND FOREIGN UNIVERSITY

TT	EXPECTED LEARNING OUTCOMES OF BFT	REFERENCE EXPECTED LEARNING OUTCOMES		
		Program: Bachelor of Food Technology	Program: Bachelor of Food Science	Program: Bachelor of Food Science and Technology
		School: Hanoi University of Science and Technology	School: UC Davis University	School: Kasetsart university
		Country: Vietnam	Country: USA	Country: Thailand
		Website link:	Website link: https://gradstudies.ucdavis.edu/programs/gfsc	Website link: http://www.ku.ac.th/kumap/Agro.html
1	General knowledge			
	ELO1: Apply knowledge of scientific basics, social sciences and humanities in career and life	1.1	a	A
2	Professional knowledge			
	ELO2: Apply food science knowledge in food research, production, and development	1.2	a	A, B
	ELO3: Analyze effects of technical factors in the production lines to ensure and improve food product quality	1.3	b	A
	ELO4: Evaluate food production technologies in accordance with the economic, social and environmental	4.1	a. b	B

	requirements of Vietnam and the world			
	ELO5: Develop food production systems, programs and quality assurance systems in accordance with national and international standards	4.2, 4.3	a, b	A, B
3	General skills			
	ELO6: Work effectively in the group as a team member or a leader to achieve the goals	3.1, 3.2		
	ELO7: Communicate effectively using multimedia and in multicultural environment; Obtain English standard as prescribed by the Ministry of Education and Training	3.3	c	
	ELO8: Use effectively information technology and modern equipment in food management, production and trading activities	3.2	c	B
4	Professional skills			
	ELO9: Apply critical thinking to effectively solve research, technology and management issues in the food industry	2.3, 4.2	c	A, B
	ELO10: Apply skills in data collection and analysis for	4.2	c	A, B

	scientific research and surveys on practical food production issues			
	ELO11: Analyze quality and safety of raw food materials, in-processing food products and final food products	2.1	a, b	A, B
	ELO12: Calculate technological parameters to select appropriate machines and equipment for economic efficiencies in food production	4.4	a, b	A, B
	ELO13: Operate procedures of food production and quality control.	4.5	a, b	A, B
5	Attitudes			
	ELO14: Demonstrate start-up spirit of and lifelong learning motivation	2.4, 2.6		
	ELO15: Perform social responsibilities, demonstrate respects for professional ethics and comply with food production laws and regulations	2.2, 2.3, 2.5		

Note:

1.1. Bachelor of Food Technology - Hanoi University of Science and Technology

1. Knowledge of solid professional background to adapt well to various jobs in a wide field of Food engineering:
 - 1.1 The ability to apply basic mathematical and physical knowledge to describe, calculate and simulate systems and production processes.
 - 1.2 The ability to apply basic technical knowledge of food technology, quality management, process and equipment in food technology to study and analyse production systems and processes.

1.3 The ability to apply technical knowledge, chemistry, biology, food technology, quality management, process and equipment in combination with the ability to exploit and use modern methods in the design and evaluation of system/ process/ product solutions in the food industry.

2. Professional skills and personal qualities necessary to succeed in a career:

2.1 The ability to analyse and solve problems.

2.2 The ability to experiment, research and discover knowledge.

2.3 Systematic and critical thinking.

2.4 Being dynamic, creative and serious.

2.5 Having professional ethics and responsibility.

2.6 Understanding contemporary issues and lifelong learning.

3. Social skills needed to work effectively in a multidisciplinary team and in an international environment:

3.1 Organizing, leading and teamwork skills.

3.2 Effective communication skills through writing, presenting, discussing, negotiating, mastering situations, effectively using modern tools and media.

3.3 Skills in using English effectively in specialized work and communicating with TOEIC score of 450 or higher.

4. The ability to participate in designing and developing system and process of production, proposing and solving technical issues in the field of Food technology in the economic, social and environmental context:

4.1 Recognition of the close relationship between technical solutions and economic, social and environmental factors in the globalized world.

4.2 The ability to recognize problems and formulate technical solutions, participate in project developing.

4.3 The ability to participate in system and production process designing.

4.4 The ability to participate in setting of system and production process, proposing and solving technical issues.

4.5 The ability to operate and exploit the system and production process, propose and solve technical issues.

1.2. Bachelor of Food Science and Technology – Kasetsart University – Thailand

A. This curriculum is concerned with:

- the basic and applied sciences involving food processing
- food biochemistry
- microbiology of food and food products
- food engineering and food quality assurance
- the application of these sciences and basic science in the food industry

B. The curriculum provides the knowledge, skills and experience involved in many areas of industry:

- the management of food processing
- maintaining the quality of food
- development of food products

1.3. Bachelor of Food Science – UC Davish – USA

a. Students gain advanced knowledge:

- The application of biological, chemical, physical and behavioral sciences
- The processing, preservation, quality evaluation, public health aspects, and utilization of foods.

b. Students graduate with the qualitative and quantitative skills necessary for professional research and teaching in food science with an emphasis in biochemistry/chemistry, microbiology/fermentation and sensory sciences

APPENDIX 3

MATRIX OF KNOWLEDGE, SKILL, AUTONOMY CAPACITY, RESPOSIBILITY WITH COURSES

No	Semester	Code	Course	Program expected learning outcomes															
				ELO1	ELO2	ELO3	ELO4	ELO5	ELO6	ELO7	ELO8	ELO9	ELO10	ELO11	ELO12	ELO13	ELO14	ELO15	
General courses																			
1	1	ML01020	Philosophy of marxism and Leninism	I						I		I						I	
2	1	ML01009	Introduction to Laws	I						I									P
3	1	TH01011	Advanced mathematics	I								I	I		I			I	
4	1	TH01009	Introduction to informatics	I				I		I	I		I				I	I	
5	1	MT01004	Analy	I	I					I					I				
6	1	KQ03212	Principles of Management 1	I				I		I								I	
7	1	TH01018	Physics	I		I									I				
8	2	ML01021	Political economy of marxism and leninism	P						P		P							P
9	2	TH01007	Probability and Statistics	P								P	R					P	
10	2	KQ03107	Basics of Marketing 1	I				I		P								P	
11	2	CP02008	General Microbiology	P	P					I					I				

12	2	CP02001	Food Physics	P	P	P									P			P
13	3	ML01022	Socialism	P						R		P						P
14	3	MT02011	Environmental Management			I	P	P	P							P		
15	3	MT01008	Ecology and Environment				I	I										I
16	4	ML01005	Ho Chi Minh ideology	P						R		M					P	R
17	4	SN01032	English 1							P							P	
18	6	ML01023	Vietnamese Communist Party History	M						M								M
19	6	SN01033	English 2							R							R	
Fundamental courses																		
20	2	CP02004	Food Chemistry	P	R	I				I					P			I
21	2	CP02006	Nutrition			I	I			I					P			I
22	3	CP02014	Food Biochemistry	R	R	P						I					P	
23	3	CP02015	Food Engineering 1			I	P	I	I						P	I	I	
24	3	CP02016	Food Engineering 2			P	P	P	P						P	P		P
25	3	CP02017	Food Engineering 3			P	P	P	P						P	P		P
26	4	CP02018	Food Processing Technology			R	P	P	P						R	P		
27	5	CP02007	Food Safety	M	R	P			P	R	P		R	P	R		P	R
28	3 (CN2), 6 (CN1)	MT02040	Food Analytics			P						P		P	P		P	

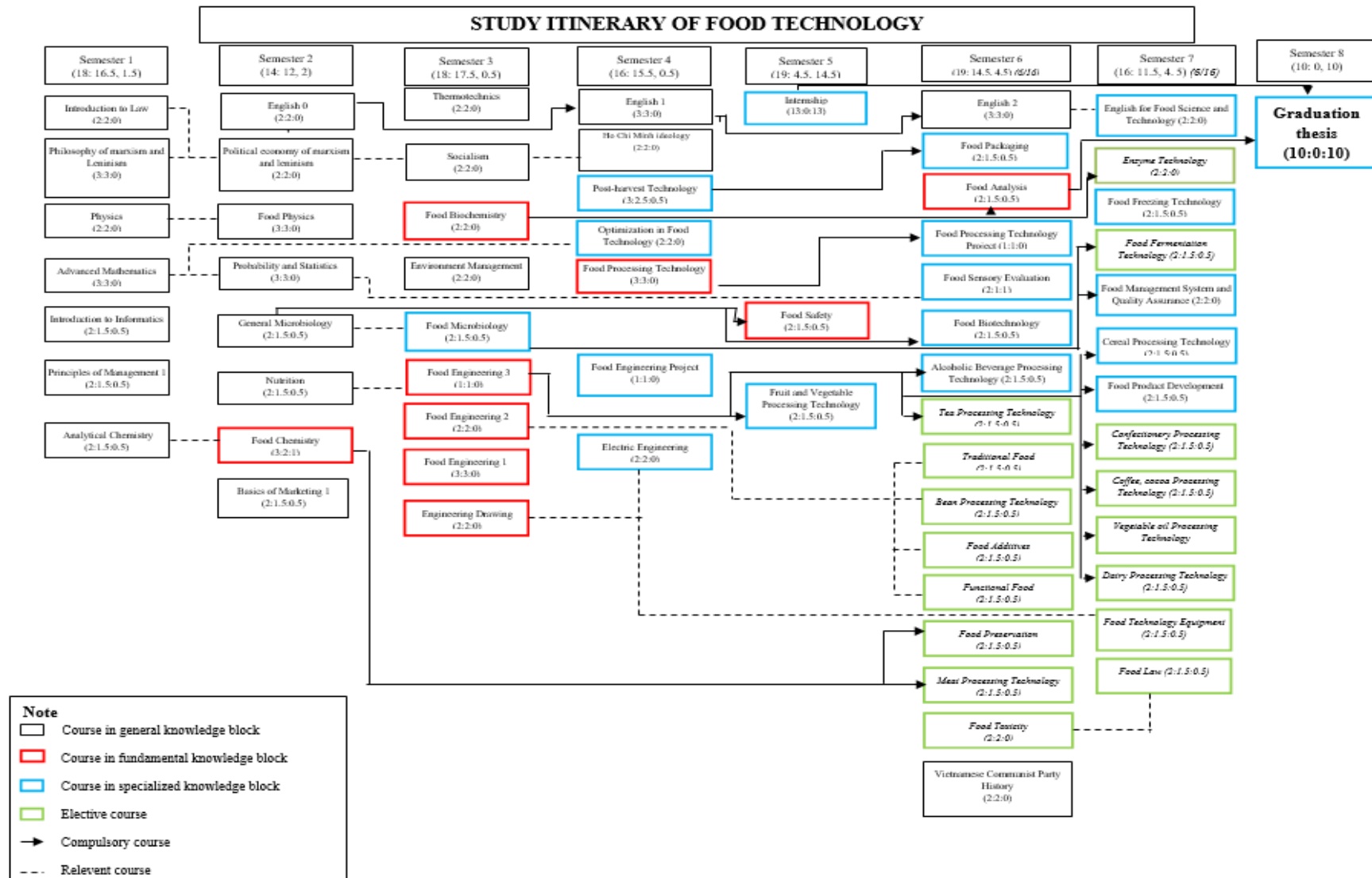
Specialized courses																		
29	3	CP03007	Food Microbiology		P	P			P					P				I
30	3	CD00006	Engineering drawing				I	P		P	P				P	P		
31	3	CD02301	Electric Engineering			I	I	P							P	P		
32	4	CP03003	Postharvest handling			P	P				P			P				P
33	4	CP03014	Optimization in food technology	R		P	I				P	R	R					I
34	4	CD02611	Electric Engineering	R		P	P	R			P				P	R		
35	4	CP02021	Food engineering project		R	R	R	R	P	P		P			R	R	P	
36	4	CP03026	Food Testing		R			P	P		P			P		P		P
37	5	CP03078	Internship		M	R	M	P	R	R	P					P	R	R
38	5	CP03057	Fruits and Vegetables Processing Technonology			P	P	P			P			P		P		
39	6	CP03006	Food Sensory evaluation					P	R					R		P		R
40	6	CP03039	Food Packaging			P		P	P					R		P		R
41	6	CP03034	Food Toxicology		R			P								P		R
42	6	CP03023	Food Legislation	R			R	R					R			R		M
43	6	CP03022	Food Additives			P		P						R		P		R
44	6	CP03020	Tea Processing Technology			R	R	R	P		R			R		R		R
45	6	CP02019	Project on Food Processing		R	R	R	R	R	R	R	R			M	R	R	

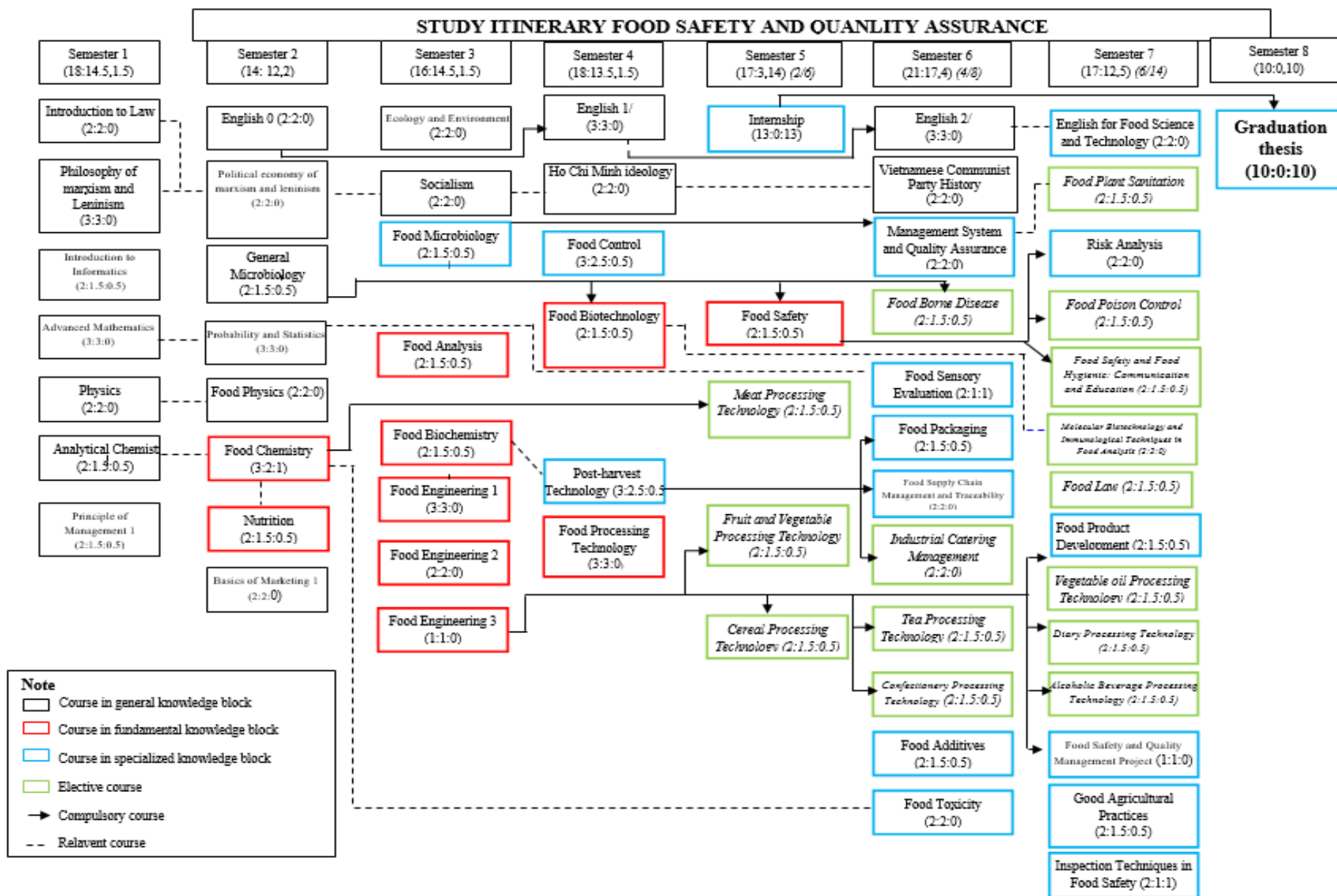
			Technology															
46	6	CP03002	Traditional Food			R	R	R						R		R		
47	6	CP03011	Bean processing technology			R	R	R	R		R			R		R		
48	6	CP03016	Food storage			R		R			R			R		R		R
49	6	CP03030	Functional Foods		P	P	P							R				
50	6	CP03050	Food supply chain management and traceability			R		R	P		R					R		R
51	6	CP03066	Food borne disease		R				P					R				R
52	6	CP03067	Industrial catering management					R								R		R
53	7	SN03022	English for Food science and Technology							M								M
54	7	CP03052	Food Product Development		M				M									M
55	7	CP03019	Technology for processing			R	R	R			R			R		R		R
56	7	CP03058	Milk Processing technology			R	R	R	R		R			R		R		R
57	7	CP03009	Food Freezing Technology			R	R	R	R		R					R		R
58	7	CD03433	Food technology Equipment			R	R	R			M					R		
59	7	CP03018	Coffee, cacao processing			R	R	R	R		R			R		R		
60	7	CP03029	Enzyme technology		R	R	R	R	R		R					R		

61	7	CP03035	Food Fermentation Technology		R	R	R	R			R			R		R		
62	7	CP03051	Inspection Techniques in Food safety					R								R		M
63	7	CP03065	Good Agricultural Practices			R		M	R							M		R
64	7	CP02012	Risk analysis			R		R								R		R
65	7	CP03025	Project on Quality Management		M	M		M	R	R		R			M	M		R
66	7	CP03015	Food plant sanitation		R	R		R	R							R		R
67	7	CP03068	Molecular Biological Methods in Food Analysis		R				R		R			M				R
68	7	CP03070	Food Safety and Hygiene: Communication and education					R	R	R						R		M
69	7	CP03071	Foodborne Illness Outbreak Management			R		R								R		R
70	8	CP04998	Thesis	M	M	M	M			M	M	M	M	M			M	M
71	4 (O2), 6 (O1)	CP03004	biotechnology		P			P	P					P				P
72	5 (O2), 6 (O1)	CP03056	Cereal Processing Technology			R	P	R	P		R			R		R		R
73	5 (O2), 6 (O1)	CP03021	Meat Processing Technology			R	P	R	P		R			R		R		R

74	6 (O1), 7 (O2)	CP03028	Alcoholic beverages			R	P	R	R		R			R		R		R
75	6 (O2), 7 (O1)	CP03001	Management System and Quality Assurance			R		M								M		R
76	6 (O2), 7 (O1)	CP03054	Confectionery Processing Technology			R	P	R	P		R			R		R		R

APPENDIX 4 Roadmap





APPENDIX 5
Improvements of the curriculum from 2019 to 2021

Academic year	Improvement level	Number of credits	Improvements	Reasons for changes
2019-2020	Minor improvements	<p>-Option of Food technology: 131 (119 of compulsory courses +12 of elective courses)</p> <p>-Option of Food Safety and Quality Management: 131 (119 of compulsory courses +12 of elective courses)</p>	<p>-Increasing of one credit for courses related to politics.</p> <p>- Courses are annually updated and improved about the content, teaching, learning and assessment methods according to VNUA's regulations</p> <p>- MsTeam is used for teaching and learning</p>	<p>- VNUA's regulations on internal quality assurance</p> <p>- According to the regulations of the Ministry of Education and Training on increasing credit number of courses related to politics.</p>
2020-2021	Minor improvements	<p>Option of Food technology: 131(119 of compulsory courses +12 of elective courses)</p> <p>-Option of Food Safety and Quality Management: 131 (119 of compulsory courses +12 of elective courses)</p>	<p>- Courses are annually updated and improved about the content, teaching, learning and assessment methods according to VNUA's regulations</p>	<p>- VNUA's regulations on internal quality assurance</p>