

**\* Biotechnology (*Honor Program*)**

<b>Total credits of the curriculum:</b>	<b>155 credits</b>
<b>- General education knowledge:</b>	<b>33 credits</b>
<i>(Not including physical education, military defense education and soft skills)</i>	
<b>- Basic courses:</b>	<b>06 credits</b>
<b>- Fundamental courses:</b>	<b>28 credits</b>
<b>- Core courses:</b>	<b>39 credits</b>
+ <i>Required:</i>	<i>29 credits</i>
+ <i>Elective:</i>	<i>10/20 credits</i>
<b>- Advanced courses:</b>	<b>49 credits</b>
+ <i>Required:</i>	<i>28 credits</i>
+ <i>Elective:</i>	<i>12/132 credits</i>
+ <i>Undergraduate thesis/ Courses replacing thesis:</i>	<i>9 credits</i>

## Available curriculum

No.	Code	Subject	Credits	Credit hours			Prerequisite
				Lecture	Practice	Self-study	
<b>I</b>		<b>General education knowledge</b> <i>(Not including subjects 11-13)</i>	<b>33</b>				
1	PHI1004	Fundamental Principles of Marxism - Leninism 1	2	24	6		
2	PHI1005	Fundamental Principles of Marxism - Leninism 2	3	36	9		PHI1004
3	POL1001	Ho Chi Minh Ideology	2	20	10		PHI1005
4	HIS1002	The Revolutionary Line of the Communist Party of Vietnam	3	42	3		POL1001
5	INT1003	Introduction to Informatic 1	2	10	20		
6	INT1005	Introduction to Informatic 3	2	12	18		INT1003
7	FLF2101	General English 1	4	16	40	4	
8	FLF2102	General English 2	5	20	50	5	FLF2101
9	FLF2103	General English 3	5	20	50	5	FLF2102
10	FLF2104	General English 4	5	20	50	5	FLF2103
11		Physical Education	4				
12		National Defence Education 1	8				
13		Soft Skills	3				
<b>II</b>		<b>Basic courses</b>	<b>6</b>				
14	HIS1056	Fundamentals of the Vietnamese Culture	3	42	3		
15	GEO1050	Earth and Life Sciences	3	30	10	5	
<b>III</b>		<b>Fundamental courses</b>	<b>28</b>				

No.	Code	Subject	Credits	Credit hours			Prerequisite
				Lecture	Practice	Self-study	
16	MAT1090	Linear Algebra	3	30	15		
17	MAT1091	Calculus 1	3	30	15		
18	MAT1192	Calculus 2	2	20	10		MAT1091
19	MAT1101	Probability and Statistics	3	27	18		MAT1091
20	PHY1100	Mechanics - Thermodynamics	3	30	15		MAT1091
21	PHY1103	Electromagnetism - Optics	3	30	15		PHY1100
22	CHE1080	General Chemistry	3	42		3	
23	CHE1081	Organic Chemistry	3	42		3	CHE1080
24	CHE1057	Analytic Chemistry	3	42		3	CHE1080
25	CHE1069	General chemistry Lab	2		30		
<b>IV</b>		<b>Core courses</b>	<b>39</b>				
<i>IV.1</i>		<i>Required</i>	<i>29</i>				
26	BIO2043	English in Biology	2	20	10		FLF2102
27	BIO2401	Cell Biology	3	25	15	5	PHY1103 CHE1081
28	BIO2400	Biochemistry	3	25	15	5	CHE1080
29	BIO1053	Genetics	3	25	15	5	BIO2401 BIO2400
30	BIO2402	Molecular Biology	3	25	15	5	BIO2401
31	BIO2403	Microbiology	3	25	15	5	BIO2401 BIO2400 BIO1053
32	BIO2205	Biostatistics	3	25	15	5	MAT1192 MAT1101

No.	Code	Subject	Credits	Credit hours			Prerequisite
				Lecture	Practice	Self-study	
33	BIO2215	Molecular Immunology	3	30	15		BIO2403
34	BIO3305	Plant systematics	2	24	6		BIO2401
35	BIO3306	Invertebrates systematics	2	24	6		BIO2401
36	BIO3307	Vertebrates systematics	2	24	6		BIO2401
<b>IV.2</b>		<b><i>Elective</i></b>	<b>10/20</b>				
37	BIO2017	Proteomics and Structural Biology	2	30			BIO2402 BIO2400
38	BIO3175	Human Biology	2	24	6		BIO2401
39	BIO2010	Developmental Biology	2	24	6		BIO2401
40	BIO2515	Scientific Research Methodology	2	30			BIO2401
41	BIO3176	Synthetic Biology	2	24	6		BIO2400
42	BIO3000	Basic Ecology	2	20	10		BIO2401
43	BIO2020	Basic virology	2	20	10		BIO2402 BIO2215
44	BIO3100	Scientific Seminar	2	10	15	5	BIO2401
45	BIO3245	Genetic Markers and Individual Identity	2	20	10		BIO2401 BIO2402
46	BIO3017	Bioenergy	2	24	6		BIO2400
<b>V</b>		<b>Advanced courses</b>	<b>49</b>				
<b>V.1</b>		<b><i>Required</i></b>	<b>28</b>				
47	BIO2021	Process and Equipment	3	30	15		BIO2402 BIO2403

No.	Code	Subject	Credits	Credit hours			Prerequisite
				Lecture	Practice	Self-study	
48	BIO2210	Biophysics	3	25	15	5	PHY1103 BIO2401
49	BIO3302	Introduction to Biotechnology	3	25	15	5	BIO2402 BIO1053
50	BIO2044	Applied Microbiology	3	25	15	5	BIO2403
51	BIO3304	Genetic Engineering	3	25	15	5	BIO1053 BIO2403
52	BIO3301	Bioinformatics	3	25	15	5	BIO2400 BIO2402
53	BIO3303	Functional Biology of Plants	3	27	15	3	BIO2401
54	BIO2206	Human and Animal Physiology	3	25	15	5	BIO2401
55	BIO2516	Nanobiology	2	24	6		BIO2401
56	BIO2514	Biotechfactory trip	2	5		25	BIO1053 BIO2403
<b>V.2.</b>		<b><i>Elective</i></b>	<b>12</b>				
<b>V.2.1</b>		<b><i>Professional courses</i></b>	<b>9</b>				
V.2.1.1		<b><i>Group A: Genetic and gen technology</i></b>	9/18				
57	BIO3314	Microbial Genetics	3	30	10	5	BIO1053 BIO2403
58	BIO3309	Protein Enzyme Technology	3	30	10	5	BIO2400
59	BIO3328	Population Genetics	3	40		5	BIO1053
60	BIO3311	Cancer Genetics	3	30	10	5	BIO2401 BIO2400

No.	Code	Subject	Credits	Credit hours			Prerequisite
				Lecture	Practice	Self-study	
61	BIO3312	Pharmaceutical biotechnology	3	27	15	3	BIO1053
62	BIO3343	Genetic modified organisms and application	3	25	15	5	BIO1053
V.2.1.2		<i>Group B: Microbiology and fermentation technology</i>	9/15				
63	BIO3313	Microbiology and Environmental Remediation	3	30	10	5	BIO2403
64	BIO3314	Microbial Genetics	3	30	10	5	BIO1053 BIO2403
65	BIO3315	Vaccine Biotechnology	3	30	10	5	BIO2402 BIO2403
66	BIO3316	Food Microbiology	3	30	10	5	BIO2403
67	BIO3317	Microbial Enzymes	3	30	10	5	BIO2403
V.2.1.3		<i>Group C: Biochemistry and protein-enzyme technology</i>	9/12				
68	BIO3344	Biochemistry of Food Processing	3	30	10	5	BIO2400 BIO2403
69	BIO3309	Protein Enzyme Technology	3	30	10	5	BIO2400
70	BIO3320	Plant Cell and Tissue Technology	3	40		5	BIO2402 BIO3303
71	BIO3210	Biochemistry of Bioactive Compounds	3	30	10	5	BIO2403
V.2.1.4		<i>Group D: Technology of cell biology</i>	9/18				
72	BIO3320	Plant Cell and Tissue Technology	3	40		5	BIO2402

No.	Code	Subject	Credits	Credit hours			Prerequisite
				Lecture	Practice	Self-study	
							BIO3303
73	BIO3345	Microalgae Biotechnology	3	25	15	5	BIO3305
74	BIO3346	Toxology	3	25	15	5	BIO3305
75	BIO3325	Animal Biotechnology	3	25	15	5	BIO2402
76	BIO3326	Stem Cell Technology	3	20	20	5	BIO2402
77	BIO3327	Tumor Biology	3	25	15	5	BIO2402
V.2.1.5		<i>Group E: Biomedical sciences</i>	9/24				
78	BIO3329	Molecular Basis of Diseases	3	40		5	BIO2403
79	BIO3330	Medical Microbiology	3	40		5	BIO2401 BIO2400
80	BIO3331	Medical Animal	3	40		5	BIO3306
81	BIO3327	Tumor Biology	3	24	15	6	BIO2402
82	BIO3332	General Epigenetics	3	27	15	3	BIO2402 BIO1053
83	BIO3249	Basic Neurobiology	3	30	10	5	BIO2401 BIO2400
84	BIO3220	Basic Endocrinology	3	30	10	5	BIO2206
85	BIO3222	Human Molecular Biology	3	25	15	5	BIO2402
V.2.1.6		<i>Group F: Biodiversity and conservation</i>	9/36				
86	BIO3347	Applied plants	3	30	10	5	BIO3305
87	BIO3348	Fungi-biology and applications	3	30	10	5	BIO3305
88	BIO3349	Plant conservation technology	3	30	10	5	BIO3305
89	BIO3228	General Entomology	3	30	10	5	BIO3306

No.	Code	Subject	Credits	Credit hours			Prerequisite
				Lecture	Practice	Self-study	
90	BIO3241	General Hydrobiology	3	30	10	5	BIO3306
91	BIO3172	Invertebrate Medicine	3	30	10	5	BIO3306
92	BIO3230	Biogeography	3	30	10	5	BIO3307
93	BIO3232	Fisheries Biology	3	30	10	5	BIO3307
94	BIO3231	Biology and Ecology of Vertebrates	3	30	10	5	BIO3307
95	BIO3150	Experiments in Ecology	3	30	10	5	BIO3307
96	BIO3339	Environment and Sustainable Development	3	30	10	5	BIO3234
97	BIO3234	Environmental Ecology	3	40		5	BIO3307
<b>V.2.2</b>		<b><i>Additional courses</i></b>	<b><i>3/9</i></b>				
98	BIO3237	Evolutionary Biology	3	30	10	5	BIO1053
99	BIO3351	Physiological bases of Microbiology	3	30	10	5	BIO2403
100	BIO3411	Histology	3	30	10	5	BIO2401
<b>V.3</b>		<b><i>Undergraduate thesis</i></b>	<b>9</b>				
101	BIO4079	<i>Undergraduate thesis or final examination</i>	9				
		<b><i>Courses replacing thesis</i></b>	9				
102		<b><i>Selection of extra 9 credits among the courses IV.2, V.2.1 and V.2.2 as an alternative to the undergraduate thesis.</i></b>					
		<b>Total</b>	<b>155</b>				