BE 03. 01. 01

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Responder's detail						
Name (optional): Toshiaki Komatsu	Occupation:	F	rofesso	or		
Establishment : TUMSAT	E-mail:	tkoma	at0@ka	iyodai.a	ac.jp	
Nationality: Japan						
Thank you for your participation in our s the grade (1 to 5) by checking X 1: Strongly disagree 2: Disagree	survey. Please 3: Neutral	e answe	r the qu 4: Agree	restions	s below re	efering to v agree
			2	3	4	5
1. The coherence between <i>Expected</i> outcomes and Study program	d learning				×	
2. The importantly of 5 criteria in <i>Expect</i>	ed learning of	utcome	5	<u>.                                    </u>		
Standard 1					X	

X
X
X
X
×
×
×
-

6. Others comments, suggestions (Please specify)

Thank you for your contentious support. We would like to continue our relationship and academic exchange.

### EXPECTED LEARNING OUTCOMES for Bachelor Bioengineering

Standard 1. Knowledge of a wide range of expertise to adapt well to job's relevant to the field of study, focusing on the ability to apply basic and specific knowledge of biological engineering with biological engineering orientations in industry, environment, medicine, food and biosafety testing:

1.1. The ability to apply mathematic and scientific knowledge to participate in designing, calculating a system, a workshop or a production process of biological products.

1.2. The ability to apply the basics knowledge of biological engineering for research and problems solving.

1.3. The ability to apply basic and specialized knowledge of biological engineering and quality management in combination with practice to identify issues related to technology, equipment and quality in bio-production. Ability to participate in production organization, to design and to evaluate technological solutions, equipment and quality of bio-products.

Standard 2. Professional skills, personal skills and personal qualities that allow learning at a higher level, the ability to self-learning to adapt to the continuous development of science and technology:

2.1. The ability to identify technical issues in the context of global economic, environmental and social.

2.2. Possess the scientific methodology of analysis to participate in projects development and implementation in the field of biotechnology.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate of knowledge, skills and attitudes, self-learning and lifelong learning.

2.4. Time management ability.

2.5. Having professional ethics, honesty and sense of responsibility, professional behavior, proactive in planning for their own careers, regularly updating information in the field of biotechnology.

Standard 3. Communication skills, teamwork and international integration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work, TOEIC  $\geq$  500.

Standard 4. Ability to develop ideas, to design, to implement and to operate in industrial and social context:

4.1. Understanding their socials role and responsibility, being aware of the impact of technical application on society, knowledge of laws and regulations in the field of biotechnology , be aware of historical and cultural contexts, be aware of current issues and global development prospects.

4.2. Adhering to the multi-culture of enterprise, mastering the business strategy, objectives and business plans, able to develop technical commercialization idea, able to adapt in different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; applying specific knowledge in design and practice.

Standard 5. Political quality; patriotism and good heath for the construction and protection of the country:

5.1. Sufficient level of political theory according to the general program of the Ministry of Education and Training.

5.2. Certificate of Physical Education and Certificate of Defense Education - Security according to the general program of the Ministry of Education and Training.

#### Responder's detail

Name (optional): Nana Somekawa

Occupation: Student

Establishment	:	TUMSAT
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E-mail: nn7267@gmail.com

Nationality: Japan

Thank you for your participation in our survey. Please answer the questions below refering to the grade (1 to 5) by checking X

1: Strongly disagree 2: Disagree 3: Neutral		4: Agree		5: Strongl	y agree
	1	. 2	3	4	5
1. The coherence between Expected learning outcomes and Study program				×	
2. The importantly of 5 criteria in Expected learning o	utcom	es			
Standard 1					X
Standard 2					×
Standard 3				×	
Standard 4				×	
Standard 5				×	
3. The <i>Expected learning outcomes</i> fits well with the industrial demand.				×	
4. The balance between theory and practice in <i>Study</i> program					×
5. The balance between generals and specials courses in <i>Study program</i>				×	
<ol> <li>Others comments, suggestions (Please specify)         Thank you for accepting and supporting us be The experiments of sweet potato starch was were to my future life. Thank you very much.     </li> </ol>	etweer very fu	n staying y In for me,s	our c so thi	iniversity. s experie	nce

Thank you for your participation

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#### Responder's detail

Name (optional): Yuki Takeya	Occupation:	Student
Tokyo university of marin	e science an	d technology
Establishment :	E-mail: yuk	i0514takeya@gmail.com

Nationality: Japan

Thank you for your participation in our survey. Please answer the questions below refering to the grade (1 to 5) by checking X

1: Strongly disagree 2: Disagree 3: Neutral	.,	4: Agree	<u>ئ</u>	: Strong	y agree
	1	. 2	3	4	5
1. The coherence between Expected learning outcomes and Study program				×	
2. The importantly of 5 criteria in Expected learning of	outcom	es			
Standard 1				×	
Standard 2				×	
Standard 3				×	
Standard 4					X
Standard 5					×
3. The <i>Expected learning outcomes</i> fits well with the industrial demand.				×	
4. The balance between theory and practice in <i>Study</i> program				×	
5. The balance between generals and specials courses in <i>Study program</i>	-				×
ş · · · · · · · · · · · · · · · · · · ·					

6. Others comments, suggestions (Please specify)

Nga sensei ,Thank you for booking our very nice room for all of us.

All tutor , thank you for supporting us during living in Vietnam. We had great time with them.

It was great experience for Freshman and Sophomore students to know about laboratories and work.

Responder's det	ail Marika Chile	Occupation:	assist.	prof.	
Name (optional):	Andre Duige		NA	have bout a	c
Establishment :	NUT	E-mail: 45	hida & Vos.	nagaonaut . a	c.Jr

Nationality: Japan

Thank you for your participation in our survey. Please answer the questions below refering to the grade (1 to 5) by checking X

1: Strongly disagree 2: Disagree 3: Neutral		4: Agree	5	: Strongl	y agree
	1	2	3	4	5
1. The coherence between <i>Expected learning</i> outcomes and Study program				*	L
2. The importantly of 5 criteria in <i>Expected learning o</i>	utcon	nes			
Standard 1				×	
Standard 2					X
Standard 3			*		
Standard 4				×	
Standard 5			×		
3. The <i>Expected learning outcomes</i> fits well with the industrial demand.				×	
4. The balance between theory and practice in <i>Study</i> program				7	
5. The balance between generals and specials courses in <i>Study program</i>				$\checkmark$	
6 Others comments suggestions (Please specify)					

### HUST MASTER PROGRAMM SURVEY

Responder's detail	
Name (optional): Josake Shida Occupation: assist- 1000000000000000000000000000000000000	.iP
Establishment: NUT E-mail: JShida G VOS. Nugavara 4.	0/
Nationality: Japan	

Thank you for your participation in our survey. Please answer the questions below referring to the grade (1 to 5) by checking X

		4: Agree	-	o. Strong	iy agree
	1	2	3	4	5
. The coherence between <i>Expected learning</i> outcomes and Study program				×	
2. The importantly of 5 criteria in <i>Expected learning</i>	outcom	es	<b>.</b>		
Standard 1				7	
Standard 2				×	
Standard 3				×	
Standard 4					×
3. The <i>Expected learning outcomes</i> fits well with the industrial demand.				$\star$	
4. The balance between theory and practice in <i>Study</i> program			+		
5. The balance between generals and specials courses in <i>Study program</i>			x		
	-				

Thank you for your participation

### EXPECTED LEARNING OUTCOMES for Bachelor Bioengineering

**Standard 1.** Knowledge of a wide range of expertise to adapt well to job's relevant to the field of study, focusing on the ability to apply basic and specific knowledge of biological engineering with biological engineering orientations in industry, environment, medicine, food and biosafety testing:

1.1. The ability to apply mathematic and scientific knowledge to participate in designing, calculating a system, a workshop or a production process of biological products.

1.2. The ability to apply the basics knowledge of biological engineering for research and problems solving.

1.3. The ability to apply basic and specialized knowledge of biological engineering and quality management in combination with practice to identify issues related to technology, equipment and quality in bio-production. Ability to participate in production organization, to design and to evaluate technological solutions, equipment and quality of bio-products.

**Standard** 2. Professional skills, personal skills and personal qualities that allow learning at a higher level, the ability to self-learning to adapt to the continuous development of science and technology:

2.1. The ability to identify technical issues in the context of global economic, environmental and social.

2.2. Possess the scientific methodology of analysis to participate in projects development and implementation in the field of biotechnology.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate of knowledge, skills and attitudes, self-learning and lifelong learning.

2.4. Time management ability.

2.5. Having professional ethics, honesty and sense of responsibility, professional behavior, proactive in planning for their own careers, regularly updating information in the field of biotechnology.

Standard 3. Communication skills, teamwork and international integration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work, TOEIC  $\geq$  500.

Standard 4. Ability to develop ideas, to design, to implement and to operate in industrial and social context:

4.1. Understanding their socials role and responsibility, being aware of the impact of technical application on society, knowledge of laws and regulations in the field of biotechnology, be aware of historical and cultural contexts, be aware of current issues and global development prospects.

4.2. Adhering to the multi-culture of enterprise, mastering the business strategy, objectives and business plans, able to develop technical commercialization idea, able to adapt in different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; applying specific knowledge in design and practice.

Standard 5. Political quality, patriotism and good heath for the construction and protection of the country:

5.1. Sufficient level of political theory according to the general program of the Ministry of Education and Training.

5.2. Certificate of Physical Education and Certificate of Defense Education - Security according to the general program of the Ministry of Education and Training.

				Semestry							
Nº	Code	Specialty	Credit (s)	$\left  \frac{1}{2} \right $	-	2		500	, ,	-	
			12		2	3	4	]		-	-
Politi	c theory and	general law		┼╌┤	-	_				-	
1	SSH1110	Marxism-Leninism I	2(2-1-0-4)			~			+		
2	SSH1120	Marxism-Leninism II	3(2-1-0-6)	╞╴┨		<u> </u>		1-			
3	SSH1050	Ho Chi Minh Ideology	2(2-0-0-4)					12	2		
4	SSH1130	Politic orientation of Vietnam Communist	3(2-1-0-6)	+				+			
5	EM1170	General law	2(2-0-0-4)		2						
Phys	ical educatio	n	05					+		+	
6	PE1014	Theory of physical education (obligatory)	1(0-0-2-0)							+	+ - +
7	PE1024	Swimming (obligatory)	1(0-0-2-0)		ļ		-			+	
8		Optional 1	1(0-0-2-0)		ļ		_			+	
9	Optional	Optional 2	1(0-0-2-0)		<b> </b>	<u> </u>	+				
10	1 -	Optional 3	1(0-0-2-0)	_		ļ	1	+			
Mili	tary educatio	on (165 credits)			ļ		1	_	_		
11	MIL1110	Military orientation of Communist	0(3-0-0-6)		<u> </u>	<u> </u>					
12	MIL1120	National defense and security	0(3-0-0-6)	_		Ļ	1_			_	
13	MIL1130	General military and technique of CKC shotgun.	0(3-0-2-8)								
For	eign languag	e	06								
14	FL1100	English I	3(0-6-0-6)	3							_
15	FL1101	English II	3(0-6-0-6)		3						
Mat	hs and Basic	Sciences	32								
16	MI1112	Analytics I	3(2-2-0-6)	3							
17	MI1122	Analytics II	3(2-2-0-6)		3						_
18	MI1132	Analytics III	3(2-2-0-6)				ĺ	3		_	
19	MI1142	Algebra	3(2-2-0-6)	3	Ţ						
20	MI3180	Statistical Probability and Experimental Design	3(3-1-0-6)						3		
21	PH1111	Physics I (Mechanic-thermal)	2(2-0-1-4)		2						
22	PH1121	Physics II (Electrical)	2(2-0-1-4)			2	2				
23	PH1131	Physics III (Optical)	2(2-0-1-4)		T			2			
24	IT1140	General informatics	4(3-1-1-8)		4						
25	CH1018	Chemistry I	2(2-1-0-4)	2	2						
26	CH3224	Organic Chemistry	2(2-1-0-4)			12	2				
27	CH3081	Physical chemistry	2(2-1-0-4)			1		2			
28	CH3082	Physical chemistry (practical work)	1(0-0-2-2)			T		1		$\uparrow$	
Bas	sic and specia	alties in biotechnology	48				$\top$				
29	CH3316	Analytical Chemistry	2(2-1-0-4)			+	2		-		
30	CH3318	Analytical Chemistry (Practical work)	1(0-0-2-2)		+-	+	1			$\uparrow$	
31	EE2012	Electro techniques	2(2-1-0-4)		+			2		+	
32	ME2015	Fundamentals of Technical Graphics	3(3-1-0-6)		+	+		3			
33	BF2701	Fundamentals of Biotechnology	2(1-1-1-4)		+		2				

### PROGRAM: BACHELOR OF BIOENGINEERING

1											
34	4 BF3711	Process and equipment in biotechnology I	2(1-1-1-4)		ł		12	ļ	ł	I	I
3:	BF3712	Process and equipment in biotechnology II	3(2-1-1-6)		+		+-	1 :	+-		+
36	BF3713	Process and equipment in biotechnology III	2(2-1-0-4)		+	+-	+		+	+-	+
37	BF4725	Techniques for measuring and Automatic control in biotechnology	2(2-0-1-4)					+		-	2
38	BF4726	Quality product management in biotechnology	2(2-0-0-4)	-+-	+-			+	+-	+	+
39	BF3714	Process and equipment in biotechnology (Project work)	1(0-2-0-2)		+				1		$\frac{1}{2}$
40	BF2702	Biochemistry	4(4-0-0-8)		+	+-	-	┢──	+		+-+
41	BF2703	Biochemistry (Practical work)	2(0-0-4-4)				$\frac{4}{2}$	-	┼	+	+
42	BF3701	Microbiology I	3(3-0-0-6)		+	+		2			+
43	BF3702	Microbiology (Practical work)	2(0-0-4-4)		+			3	<u> </u>		+ - 1
44	BF3703	Cell biology	2(2-0-1-4)	+	-			2	╞──		┼──┤
45	BF3704	Immunology	$2(2 \circ 1 + 4)$ 2(2-0-0-4)	+				4			$\left  - \right $
46	BF3705	Genetics and molecular biology	3(2-2-0-6)			+			2	<u> </u>	$\vdash$
47	BF3706	Genetic engineering	3(2-0, 1, 4)						3	<u> </u>	
48	BF3707	Bioinformatics	2(2-0-1-4)	+			$\left  - \right $		2		
49	BF3708	Analytical methods in biotechnology	2(1-0-2-4)						2		
50	BF4727	Project work in biotechnology	2(2-0-1-4)	-					2		
Add	itional know	ledge	2(0-4-0-4)							2	
51	EM1010	General management	09								
52	EM1180	Business culture and start un	2(2-1-0-4)								
53	ED3280	Psychology applicative	2(2-1-0-4)	$\left  \right $		L				2	
54	ED3220	Soft skills	2(1-2-0-4)								
55	ET3262		2(1-2-0-4)								
56	TFX3123	Industrial design	2(1-2-0-4)								
57	BE2020	Trache inclusion	2(1-2-0-4)								
Onti	Onal for appl	rechnical writing and Presentation	3(2-2-0-6)								
com	oulsory modu	ile (11 credits)	16								
Mod	ule 1: Orienta	tion Biotechnology Environment	11				-+	_		-+	
58	BF4701	Biological engineering for waste treatment	3(2-2-0-6)					+	-+	2	
59	BF4702	Environmental Toxicology	2(2-0-0-4)				-+	-+		2	
60	BF4703	Environmental Microbiology	$2(2 \circ \circ 1)$ 2(2-0-0-4)		+				+	$\frac{2}{2}$	
61	EV4241	Environmental Management	$2(2 \circ \circ 4)$ $2(2 \circ 0 \circ 4)$	- +	-+			-	-+	$\frac{2}{2}$	
62	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)						-+	2	
Modi	ile 2: Orienta	tion Biotechnology and Food Technology	11	-+	_		-			-	
63	BF4705	Fermentation Engineering	3(2-2-0-6)						-	3	-
64	BF4706	Rapid Methods in Food Industry	2(2-0-1-4)		$\rightarrow$					$\frac{3}{2}$	
65	BF4707	Food Microbiology	2(2-0-0-4)		-+		-+-	-	_	2	-
66	BF4511	Enzymes in Food Technology	2(2-0-0-4)				-+-	-		$\frac{2}{2}$	
67	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)	-+				+		$\frac{2}{2}$	
Modu	ile 3: Orienta	tion Biotechnology for industry	11	-+	-			+	+		
68	BF4705	Fermentation Engineering	3(2-2-0-6)		+			+		2	$\neg$
69	BF4709	Downstream processing	2(2-0-0)						-+	<u>-</u>	_
70	BF4711	Industrial Microbiology	2(2 - 0 - 0 - 4)			+			-	2	_
71	BF4712	Enzyme	2(2 - 0 - 0 - 4)		-+			-		2	
72	BF4708	Fermentation Engineering (Practical work)	$\frac{2(2-0-0-4)}{2(0,0,1,4)}$					-		2	
14	00/17/00	Institution Englisering (Fractical WOIK)	2( <b>0-0-4-4</b> )							2	

Modu	le 4: Orientat	ion Molecular biology and cell Engineering	11						<u> </u>	_
73	BF4713	Animal cell technology	3(2-2-0-6)		$\downarrow \downarrow$			_	3	_
74	BF4714	Molecular diagnostics	2(2-0-1-4)					<u> :</u>	2	$\neg$
75	BF4715	Virus culture technology	2(2-0-0-4)		$\downarrow$				2	
76	BF4716	Recombinant DNA technology	2(2-0-0-4)		1	1			2	
77	BF4717	Recombinant DNA technology (Practical	2(0-0-4-4)						2	
		work)	++	-	+	$\vdash$	-+	+		-
Other	rs: student sel	lects 5 credits	05		4					
78	BF4718	Techniques obtaining bioactive compounds from plant	2(2-1-0-4)							
79	BF4719	Techniques obtaining bioactive compounds from plant (Practical work)	2(0-0-4-4)							_
80	BF4721	Genetically Modified Organism and Application	2(2-0-0-4)					_		
81	BF4722	Plant Cell and Tissue Culture Technology	2(2-0-0-4)			++				$\neg$
82 -	BF4723	Animal cell technology (Practical work)	2(0-0-4-4)			+				
83	BF4724	Enzyme technology (Practical work)	2(0-0-4-4)		_	+				
84	BF4701	Biological engineering for waste treatment	3(2-2-0-6)			+				
85	BF4702	Environmental Toxicology	2(2-0-0-4)	_	_					
86	BF4703	Environmental Microbiology	2(2-0-0-4)			1		$ \_ \downarrow$		
87	EV4241	Environmental Management	2(2-0-0-4)							
88	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)							
89	BF4705	Fermentation Engineering	3(2-2-0-6)	' <u></u>						
90	BF4706	Rapid Methods in Food Industry	2(2-0-0-4)	۱ <u> </u>					<b> </b>	
91	BF4707	Food Microbiology	2(2-0-0-4)			1			$ \downarrow \downarrow$	
92	BF4511	Enzymes in Food Technology	2(2-0-0-4)		_	1	1		<b> </b>	
93	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)							
94	BF4709	Downstream processing	2(2-0-0-4)			4	ļ			
95	BF4711	Industrial Microbiology	2(2-0-0-4)				<u> </u>	L		
96	BF4712	Enzyme	2(2-0-0-4)							
97	BF4713	Animal cell technology	3(2-2-0-6)							
98	BF4714	Molecular diagnostics	2(2-0-0-4)			$\bot$	$\square$	L		
99	BF4715	Virus culture technology	2(2-0-0-4)			$\bot$	Ĺ	Ĺ		
100	BF4716	Recombinant DNA technology	2(2-0-0-4)				$\bot$	$\bot$		
101	BF4717	Recombinant DNA technology (Practical work)	2(0-0-4-4)							
Tec	hnique stage	and Bachelor thesis	08			T	Γ			
102	BF4781	Technical practice in Bioengineering	2(0-0-6-4)							2
103	BF4791	Bachelor thesis in Bioengineering	6(0-0-12-12)			1				6

### EXPECTED LEARNING OUTCOMES for Master Biotechnology

**Standard 1**. Knowledge of a wide range of expertise to adapt well to job's relevant to the field Biotechnology and able to work independently:

1.1. The ability to apply deep scientific knowledge to solve problems in biotechnology.

1.2. The ability to synthetize and analyses scientific information and its application in research, production.

1.3. The ability to analyses and solve technique problems in production line; capable to apply new techniques and tools of biotechnology.

Standard 2. Professional skills and personal skills to success: work scientifically, good strategic thinking and well adapt to international environment:

2.1. The ability to analyses and evaluate technical issues in the context of global economic, environmental and social.

2.2. Having the scientific methodology of thinking to establish a project, the implementation of a bioprocess.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate.

2.4. Time management and personal project management.

2.5. Having professional ethics, honesty, sense of responsibility, professional behavior, able to update in a selective way the information in the field of biotechnology.

2.6. Professional and scientific working; good systematic and scientific thinking; able to adapt to international scientific activities.

Standard 3. Social skills to integrate in a multidisciplinary collaboration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work, TOEIC  $\geq$  550.

**Standard** 4. Having the ability to self-learning, to update knowledge and to do scientific research. Ability to apply scientific knowledge to solve real issues:

4.1. Understanding the role of applying technology for the development of society. Understanding of national laws and regulations in biotechnology. Be aware of historical and cultural contexts; be aware of current issues and global development prospects.

4.2. Having the idea of commercialize the scientific products when respecting the culture, objective and business plan of enterprise. Having the ability to adapt to different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; apply scientific knowledge to develop and realize a project.

4.5. Ability of regularly updates knowledge, doing scientific research, writing scientific report; possibility to apply special knowledge and scientific achievements to solve practical issues.

		PROGRAM: MASTER IN	BIOTECHN	OLOGY			
]			Credit(a)		Semester		
Nº	Code	Subject		9	10		
Gener	al knowled	lge					
1	SS6011	Philosophy	3	3		╞╌╋┼╼	
2	FL6010	English					
Comp	ulsory (15	credits)	15			┿╌╌╋┼╼	_
3	BF6713	Bio-separation of biological products	2(2-0-0-4)	2		<b>└─── </b>	
4	BF6714	Special experiments of Bioengineering	1(0-0-2-2)	1		₽	
5	BF6731	Proteomics	2(2-0-0-4)	2		<b>↓₿</b> ↓_	
6	BF6736	Gene regulation and expression	2(2-0-0-4)	2		<u>                                      </u>	
7	BF6742	Microbial Metabolism	2(2-0-0-4)	2			
8	BF6761	Monitoring and control of fermenters	3(3-0-0-6)	3			
9	BF6762	Biocatalysts	3(3-0-0-6)	3			
Optio	nal (6 cred	its)	6		6		
10	BF6122	Product innovation	2(2-1-0-4)				
11	BF6414	Experimental data analysis	2(2-1-0-4)				
12	BF6723	Bioremediation	2(2-0-0-4)				
13	BF6725	Biofuel	2(2-0-0-4)				
14	BF6726	Probiotic and Prebiotic	2(2-0-0-4)				
15	BF6728	Biopolymer	2(2-0-0-4)				
16	BF6743	Extraction, separation, isolation and evaluation of biological compounds	2(2-1-0-4)				
17	BF5717	Diagnostic kit manufacturing technology	2(2-0-0-4)				
18	BF5718	Recombinant Protein Technology	2(2-0-0-4)				
19	BF5722	Nano-biomaterials	2(2-0-0-4)				
Prese	entation (6	credits)	6				Ţ
20	BF6767	Seminar 1 (or project 1)	2		2		
21	BF6768	Seminar 2 (or project 2)	2		2	1	t
22	BF6769	Seminar 3 (or project 3)	2		2		t
Thes	is (15 credi	ts)	15			-	t
23	BF6702	Thesis for master of science	15(0-0-30- 30)		-	15	

# **HUST-NUT Bioengineering DDP program**

Year	Campus	Criteria	Class Name	NUT	HUST
		General	SS6011 Philosophy		3
	a tanan a sa a sa afa		BF6731 -Proteomics		2
1st			Bir675to - Generic guilticion and expression as a	<u>2</u>	2
			BR6762 - Brocalitissis		- <u></u>
1st	HUST	Compulsory	BF6742=Mncrobielsmeinbolism	<u> </u>	2.000
1			BF6761 - Monitoring and control of fermentors		3
	in a state of the provide state		BF6713 - Bioseparation of biological products		2
			BF6714 - Special experiments of Bioengineering		1
		Elective	Elective subjects		6
			00FCC5 Japanese Industrial Development	2	2
		General	Experience	_	
			00FBA5 Technology and Public Policy	2	2
			00FCD5 Gigaku Innovation and Creativity	2	2
			15AGC6 Seminar on Bioengineering 1	2	and a second
			15AGD6 Seminar on Bioengineering 2	2	2
	est da servat Desida Rice est d'arte encad Ne True Back estatu		15AGE6 Seminar on Bioengineering 3	2	te
			15AGF6 Seminar on Bioengineering 4	2	2
Year Ca	NUL	Compulsory	15AGA6 Special Experiments of Bioengineering 1	4	
			15AGB6 Special Experiments of Bioengineering 2	4	
	e en de		17AAI5 Research Integrity	1	
			15AAZ5 Seminar on Bioengineering for foreign		
		Flective	students	2	
		EACCHVC	Reserch Project Seminor for Foriegn Students 1	2	2
1st 2nd			Reserch Project Seminor for Foriegn Students 2	4	
			Credits required for Master's degree	30	45

: NUT will use for the corresponding subjects. : HUST will use for Master's thesis (15 credits).

### Credits required for Master's degree

University	Credits	Note
NUT	30	General : 6 credits Compulsory : 16 credits Elective : 8 credits
HUST	45	Compulsory : 24 credits Elective : 6 credits Master's thesis : 15 credits

# PROGRAM FOR MASTER SCIENCE IN BIOTECHNOLOGY

#### HUST

### (INTERGRATED PROGRAM)

CONTENT	CODE	SUBJECT	CREDITS	QUANTITY
Comonal	SS6011	Philosophy	3	
General	FL6010	English		Self learning
Compulsory	BF6713	Bioseparation of biological	2	2(2, 0, 0, 4)
(15 credits)	DI 0715	products	2	2(2-0-0-4)
	BF6714	Special experiments of Bioengineering	1	1(0-0-2-2)
	BF6731	Proteomics	2	2(2-0-0-4)
	BF6736	Gene regulation and expression	2	2(2-0-0-4)
	BF6742	Microbial Metabolism	2	2(2-0-0-4)
	BF6761	Monitoring and control of fermentors	3	3(3-0-0-6)
	BF6762	Biocatalysis	3	3(3-0-0-6)
Optional	BF6122	Product innovation	2	2(2-1-0-4)
(6 credits)	BF6414	Experimental data analysis	2	2(2-1-0-4)
	BF6723	Bioremediation	2	2(2-0-0-4)
	BF6725	Biofuel	2	2(2-0-0-4)
	BF6726	Probiotic and Prebiotic	2	2(2-0-0-4)
	BF6728	Biopolymer	2	2(2-0-0-4)
	BF6743	Extraction, separation, isolation and evaluation of biological compounds	2	2(2-1-0-4)
	BF5717	Diagnostic kit manufacturing technology	2	2(2-0-0-4)
	BF5718	Recombinant Protein Technology	2	2(2-0-0-4)
	BF5722	Nanobiomaterials	2	2(2-0-0-4)
Presentation	BF6767	Seminar 1 (or project 1)	2	
(6 credits)	BF6768	Seminar 2 (or project 2)	2	
	BF6769	Seminar 3 (or project 3)	2	
Thesis (15 credits)	BF6702	Thesis for master of science	15	15(0-0-30-30)
Total			45	
1.01001				

Name (optional): Paisuke KASAI Name (optional): Paisuke KASAI Establishment: Nagaoka University of Technology E-mail: Jkasai Je@ Vos. nagaoka ut.ac. jp Nationality: JARAH

Thank you for your participation in our survey. Please answer the questions below refering to the grade (1 to 5) by checking X

1: Strongly disagree 2: Disagree 3: Neutra	!	4: Agree	-	5: Strong	gly agree
	1	2	3	4	5
1. The coherence between Expected learning outcomes and Study program					$\bigvee$
2. The importantly of 5 criteria in <i>Expected learning</i>	outcon	nes			
Standard 1					
Standard 2					
Standard 3					V
Standard 4					V.
Standard 5					
3. The <i>Expected learning outcomes</i> fits well with the industrial demand.	n				V
4. The balance between theory and practice in <i>Stud program</i>	v				
5. The balance between generals and special courses in <i>Study program</i>	s				
6. Others comments, suggestions (Please specify)		1	1		<u></u>

#### Thank you for your participation

# HUST MASTER PROGRAMM SURVEY

Responder's detail	sAl
Name (optional): Daisute	Occupation:
Establishment : Magaoka Univ	Stechnology E-mail: dkasai2@vos.vagookaut."
Nationality: JRRA	

Thank you for your participation in our survey. Please answer the questions below referring to the grade (1 to 5) by checking X

1: Strongly disagree       2: Disagree       3: Neutral       4: Agree         1       2         1. The coherence between Expected learning outcomes and Study program       2         2. The importantly of 5 criteria in Expected learning outcomes         Standard 1         Standard 2         Standard 4         3. The Expected learning outcomes fits well with the industrial demand.         4. The balance between theory and practice in Study program         5. The balance between generals and specials courses in Study program         6. Others comments, suggestions (Please specify)	2	5: Strong	ly agree			
		1	2	3	4	5
1.	The coherence between <i>Expected learning</i> outcomes and Study program					V
2.	The importantly of 5 criteria in <i>Expected learning o</i>	utcom	es			
	Standard 1					V
	Standard 2					V
	Standard 3			·		V
	Standard 4					V
3.	The <i>Expected learning outcomes</i> fits well with the industrial demand.	· · · · · · · · · · · · · · · · · · ·				V
4.	The balance between theory and practice in <i>Study</i> program	<u> </u>				$\bigvee$
5.	The balance between generals and specials courses in <i>Study program</i>					$\bigvee$
6.	Others comments, suggestions (Please specify)				<u></u>	<u> </u>

### EXPECTED LEARNING OUTCOMES for Bachelor Bioengineering

Standard 1. Knowledge of a wide range of expertise to adapt well to job's relevant to the field of study, focusing on the ability to apply basic and specific knowledge of biological engineering with biological engineering orientations in industry, environment, medicine, food and biosafety testing:

1.1. The ability to apply mathematic and scientific knowledge to participate in designing, calculating a system, a workshop or a production process of biological products.

1.2. The ability to apply the basics knowledge of biological engineering for research and problems solving.

1.3. The ability to apply basic and specialized knowledge of biological engineering and quality management in combination with practice to identify issues related to technology, equipment and quality in bio-production. Ability to participate in production organization, to design and to evaluate technological solutions, equipment and quality of bio-products.

Standard 2. Professional skills, personal skills and personal qualities that allow learning at a higher level, the ability to self-learning to adapt to the continuous development of science and technology:

2.1. The ability to identify technical issues in the context of global economic, environmental and social.

2.2. Possess the scientific methodology of analysis to participate in projects development and implementation in the field of biotechnology.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate of knowledge, skills and attitudes, self-learning and lifelong learning.

2.4. Time management ability.

2.5. Having professional ethics, honesty and sense of responsibility, professional behavior, proactive in planning for their own careers, regularly updating information in the field of biotechnology.

Standard 3. Communication skills, teamwork and international integration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work, TOEIC  $\geq$  500.

Standard 4. Ability to develop ideas, to design, to implement and to operate in industrial and social context:

4.1. Understanding their socials role and responsibility, being aware of the impact of technical application on society, knowledge of laws and regulations in the field of biotechnology, be aware of historical and cultural contexts, be aware of current issues and global development prospects.

4.2. Adhering to the multi-culture of enterprise, mastering the business strategy, objectives and business plans, able to develop technical commercialization idea, able to adapt in different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; applying specific knowledge in design and practice.

Standard 5. Political quality, patriotism and good heath for the construction and protection of the country:

5.1. Sufficient level of political theory according to the general program of the Ministry of Education and Training.

5.2. Certificate of Physical Education and Certificate of Defense Education - Security according to the general program of the Ministry of Education and Training.

						S	eme	estr	y		
N⁰	Code	Specialty	Credit (s)	1	2	3	4	5	6	7	8
Politi	c theory and	general law	12								
1	SSH1110	Marxism-Leninism I	2(2-1-0-4)		2						-
2	SSH1120	Marxism-Leninism II	3(2-1-0-6)			3					
3	SSH1050	Ho Chi Minh Ideology	2(2-0-0-4)		ļ			2			
4	SSH1130	Politic orientation of Vietnam Communist	3(2-1-0-6)					<u> </u>	3	ļ	-
- <u>-</u> -	EM1170	General law	2(2-0-0-4)		2			<u> </u>		<u> </u>	
Phys	ical educatio	n	05						ļ		1
6	PE1014	Theory of physical education (obligatory)	1(0-0-2-0)					_			-
7	PE1024	Swimming (obligatory)	1(0-0-2-0)								1
		Optional 1	1(0-0-2-0)								-
9	Optional	Optional 2	1(0-0-2-0)					↓			$\downarrow$
10		Optional 3	1(0-0-2-0)								1
Mili	tary educatio	on (165 credits)									1
11	MIL1110	Military orientation of Communist	0(3-0-0-6)								
12	MIL1120	National defense and security	0(3-0-0-6)								
13	MIL1130	General military and technique of CKC shotgun.	0(3-0-2-8)								
For	eign languag	e	06								
14	FL1100	English I	3(0-6-0-6)	3							
15	FL1101	English II	3(0-6-0-6)		3						
Ma	ths and Basic	: Sciences	32								
16	MI1112	Analytics I	3(2-2-0-6)	13	3						
17	MI1122	Analytics II	3(2-2-0-6)		3	;					
18	MI1132	Analytics III	3(2-2-0-6)				3	3			Ţ
19	MI1142	Algebra	3(2-2-0-6)	13	3						
20	MI3180	Statistical Probability and Experimental Design	3(3-1-0-6)						3		
21	PH1111	Physics I (Mechanic-thermal)	2(2-0-1-4)		2	2					
22	PH1121	Physics II (Electrical)	2(2-0-1-4)			2					
23	PH1131	Physics III (Optical)	2(2-0-1-4)				2	2			
24	IT1140	General informatics	4(3-1-1-8)		4	1			1		_
25	CH1018	Chemistry I	2(2-1-0-4)		2			-			-
26	CH3224	Organic Chemistry	2(2-1-0-4)	-  -		2	:				
27	CH3081	Physical chemistry	2(2-1-0-4)			+		2			-
28	CH3082	Physical chemistry (practical work)	1(0-0-2-2)		-	-		1			
Bas	sic and specia	lties in biotechnology	48		+	-+	+	-			-
29	CH3316	Analytical Chemistry	2(2-1-0-4)		+	1,	+-	+	-+-	-+-	+
30	CH3318	Analytical Chemistry (Practical work)	1(0-0-2-2)			1	+	+-			$\dashv$
31	EE2012	Electro techniques	2(2-1-0-4)		+	- <u> </u> -	+	,+	+		$\dashv$
32	ME2015	Fundamentals of Technical Graphics	3(3-1-0-6)	-+-	+	+		3	-		+
33	BF2701	Fundamentals of Biotechnology	2(1-1-1-4)				+-			-+-	
			_ <del>_</del> \* * * ₹ <i>I</i>			1 4	1	1	1	1	

# PROGRAM: BACHELOR OF BIOENGINEERING

34	BF3711	Process and equipment in his of his									
35	BF3712	Process and equipment in biotechnology I	2(1-1-1-4)				2				1
36	BF3713	Process and equipment in biotechnology II	3(2-1-1-6)				-1	3	1	+-	+
		Techniques for measuring 11	2(2-1-0-4)				- 1		2	1	+
37	BF4725	control in biotechnology	2(2-0-1-4)								2
38	BF4726	Quality product management in biotechnology	2(2-0-0-4)				-+		<u> </u>	┼──	1
39	BF3714	Process and equipment in biotechnology (Project work)	1(0-2-0-2)				-+		1		
40	BF2702	Biochemistry	4(4-0-0-8)	-+			+			┟	<u> </u>
41	BF2703	Biochemistry (Practical work)	2(0-0-4-4)	+			+			<u> </u>	
42	BF3701	Microbiology I	3(3-0-0-6)					_		┝	
43	BF3702	Microbiology (Practical work)	2(0-0-4-4)	++			+	3		įi	—
44	BF3703	Cell biology	2(0-0-4-4)				-	2			
45	BF3704	Immunology	2(2-0-1-4)	+-+				2			
46	BF3705	Genetics and molecular biology	2(2-0-0-4)	┝─┤	-+		+		2		
47	BF3706	Genetic engineering	3(2-2-0-0)	+		-	+		3		
48	BF3707	Bioinformatics	2(2-0-1-4)	┢╌┼			+	-+	2		
49	BF3708	Analytical methods in biotechnology	2(1-0-2-4)	+			_	-	2	-+	
50	BF4727	Project work in higtechnology	2(2-0-1-4)	+				_	2		
Addi	tional knowl	edge	2(0-4-0-4)	+			_	$\downarrow$		2	
51	EM1010	General management	2(2,1,0,4)								
52	EM1180	Business culture and start-up	2(2-1-0-4)				+				
53	ED3280	Psychology applicative	2(2-1-0-4)	$\vdash$				_	_	2	
54	ED3220	Soft skills	2(1-2-0-4)	╞╴┼	_						
55	ET3262	Technological concerts & technical 1	2(1-2-0-4)	┥─┼	_		_	_	-		
56	TFX3123	Industrial design	2(1-2-0-4)						-		
57	BE2020	Technical Writing and Descent i	2(1-2-0-4)	-							
Optic	nal for appli	reclinical writing and Presentation	3(2-2-0-6)				_	_			
comp	ulsory modu	le (11 credits)	16			İ					
Modu	le 1: Orienta	tion Biotechnology Environment	11		_		+				
58	BF4701	Biological engineering for waste treatment	3(2-2-0-6)				-			3	
59	BF4702	Environmental Toxicology	2(2-0-0-4)							2	
60	BF4703	Environmental Microbiology	2(2-0-0-4)				+	-		2	
61	EV4241	Environmental Management	2(2-0-0-4)				+			2	
62	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)							2	
Modu	le 2: Orienta	tion Biotechnology and Food Technology	11				+		+	+	
63	BF4705	Fermentation Engineering	3(2-2-0-6)				-	$\top$		3	$\neg$
64	BF4706	Rapid Methods in Food Industry	2(2-0-1-4)					+	-	2	$\neg$
65	BF4707	Food Microbiology	2(2-0-0-4)					$\uparrow$		$\frac{1}{2}$	
66	BF4511	Enzymes in Food Technology	2(2-0-0-4)				1			2	
67	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)		-+-		1			2	
Modu	le 3: Orienta	tion Biotechnology for industry	11		-†-						
68	BF4705	Fermentation Engineering	3(2-2-0-6)	<u>† - †</u>	1				-†	3	
60	BF4700	Downstream processing	2(2-0-0-4)				1	1		2	
70	BF4711	Industrial Microbiology	2(2-0-0-4)	$\dagger$		$\top$	1	1		2	$\neg$
71	BF4712	Enzyme	2(2-0-0-4)		$\neg$	_	$\uparrow$	-†	+	2	
70	DE4709	Fermentation Engineering (Practical work)	2(0-0-4-4)					-		2	

		L. U.F. singering	111	ł			1			
Modu	le 4: Orienta	tion Molecular biology and cell Engineering	3(2-2-0-6)		-+	-		+	3	1
73	BF4713	Animal cell technology	3(2-2-0-0)	-+				$-\dagger$	2	
74	BF4714	Molecular diagnostics	2(2-0-1-4)		_+-			+	2	-
75	BF4715	Virus culture technology	2(2-0-0-4)		-+-				2	
76	BF4716	Recombinant DNA technology	2(2-0-0-4)	-+-			+		_	
77	BF4717	Recombinant DNA technology (Practical work)	2(0-0-4-4)						2	
Other	s: student se	elects 5 credits	05							
78	BF4718	Techniques obtaining bioactive compounds from plant	2(2-1-0-4)							
79	BF4719	Techniques obtaining bioactive compounds from plant (Practical work)	2(0-0-4-4)			_	<u> </u>			
80	BF4721	Genetically Modified Organism and Application	2(2-0-0-4)							
81	BF4722	Plant Cell and Tissue Culture Technology	2(2-0-0-4)	<b> </b>						
82	BF4723	Animal cell technology (Practical work)	2(0-0-4-4)							
83	BF4724	Enzyme technology (Practical work)	2(0-0-4-4)				+			<u> </u>
84	BF4701	Biological engineering for waste treatment	3(2-2-0-6)							L
85	BF4702	Environmental Toxicology	2(2-0-0-4)							
86	BF4703	Environmental Microbiology	2(2-0-0-4)						<u> </u>	
87	EV4241	Environmental Management	2(2-0-0-4)							
88	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)							
89	BF4705	Fermentation Engineering	3(2-2-0-6)							
90	BF4706	Rapid Methods in Food Industry	2(2-0-0-4)							
91	BF4707	Food Microbiology	2(2-0-0-4)							
92	BF4511	Enzymes in Food Technology	2(2-0-0-4)							
93	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)							
94	BF4709	Downstream processing	2(2-0-0-4)						1	
95	BF4711	Industrial Microbiology	2(2-0-0-4)						1	<b> </b>
96	BF4712	Enzyme	2(2-0-0-4)	1				-	+	<u> </u>
97	BF4713	Animal cell technology	3(2-2-0-6)					1		<u> </u>
98	BF4714	Molecular diagnostics	2(2-0-0-4)				+	+	+	
99	BF4715	Virus culture technology	2(2-0-0-4)				+	+	+	
100	BF4716	Recombinant DNA technology	2(2-0-0-4)	+			+	+-		
101	BF4717	Recombinant DNA technology (Practical work)	2(0-0-4-4)	┼╼┥	-+			-		
Tech	nique stage	and Bachelor thesis	08	┼─┤		-+-	+			
102	BF4781	Technical practice in Bioengineering	2(0-0-6-4)	$\left\{ -\right\}$	-+-		+	+		2
103	BF4791	Bachelor thesis in Bioengineering	6(0-0-12-12)	<u>†</u> −-†		-+-	+-	+		<u> </u>



### EXPECTED LEARNING OUTCOMES for Master Biotechnology

**Standard 1**. Knowledge of a wide range of expertise to adapt well to job's relevant to the field Biotechnology and able to work independently:

1.1. The ability to apply deep scientific knowledge to solve problems in biotechnology.

1.2. The ability to synthetize and analyses scientific information and its application in research, production.

1.3. The ability to analyses and solve technique problems in production line; capable to apply new techniques and tools of biotechnology.

**Standard** 2. Professional skills and personal skills to success: work scientifically, good strategic thinking and well adapt to international environment:

2.1. The ability to analyses and evaluate technical issues in the context of global economic, environmental and social.

2.2. Having the scientific methodology of thinking to establish a project, the implementation of a bioprocess.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate.

2.4. Time management and personal project management.

2.5. Having professional ethics, honesty, sense of responsibility, professional behavior, able to update in a selective way the information in the field of biotechnology.

2.6. Professional and scientific working; good systematic and scientific thinking; able to adapt to international scientific activities.

Standard 3. Social skills to integrate in a multidisciplinary collaboration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work, TOEIC  $\geq$  550.

**Standard** 4. Having the ability to self-learning, to update knowledge and to do scientific research. Ability to apply scientific knowledge to solve real issues:

4.1. Understanding the role of applying technology for the development of society. Understanding of national laws and regulations in biotechnology. Be aware of historical and cultural contexts; be aware of current issues and global development prospects.

4.2. Having the idea of commercialize the scientific products when respecting the culture, objective and business plan of enterprise. Having the ability to adapt to different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; apply scientific knowledge to develop and realize a project.

4.5. Ability of regularly updates knowledge, doing scientific research, writing scientific report; possibility to apply special knowledge and scientific achievements to solve practical issues.

	PROGRAM: MASTER IN BIOTECHNOLOGY								
N°	Code	Subject	Credit(s)		Semester				
				9	10	11			
Gener	al knowled	lge							
1	SS6011	Philosophy	3	3					
2	FL6010	English							
Comp	ulsory (15	credits)	15						
3	BF6713	Bio-separation of biological products	2(2-0-0-4)	2					
4	BF6714	Special experiments of Bioengineering	1(0-0-2-2)	1					
5	BF6731	Proteomics	2(2-0-0-4)	2					
6	BF6736	Gene regulation and expression	2(2-0-0-4)	2					
7	BF6742	Microbial Metabolism	2(2-0-0-4)	2					
8	BF6761	Monitoring and control of fermenters	3(3-0-0-6)	3					
9	BF6762	Biocatalysts	3(3-0-0-6)	3					
Optio	nal (6 cred	its)	6		6				
10	BF6122	Product innovation	2(2-1-0-4)						
11	BF6414	Experimental data analysis	2(2-1-0-4)						
12	BF6723	Bioremediation	2(2-0-0-4)						
13	BF6725	Biofuel	2(2-0-0-4)						
14	BF6726	Probiotic and Prebiotic	2(2-0-0-4)						
15	BF6728	Biopolymer	2(2-0-0-4)						
16	BF6743	Extraction, separation, isolation and evaluation of biological compounds	2(2-1-0-4)						
17	BF5717	Diagnostic kit manufacturing technology	2(2-0-0-4)						
18	BF5718	Recombinant Protein Technology	2(2-0-0-4)						
19	BF5722	Nano-biomaterials	2(2-0-0-4)						
Prese	ntation (6 d	credits)	6			<b>↓</b>			
20	BF6767	Seminar 1 (or project 1)	2		2	<b>├</b> ── <b>}</b>			
21	BF6768	Seminar 2 (or project 2)	2.		2	<b> </b>			
22	BF6769	Seminar 3 (or project 3)	2		2				
Thesis	s (15 credit	ts)	15						
23	BF6702	Thesis for master of science	15(0-0-30- 30)			15			

PROGRAM: MASTER IN BIOTECHNOLOGY									
			Cradit(s)		Semester				
Nº.	Code	Subject	Creun(s)	9	10	1	1		
Gener	al knowled	dge			<u> </u>	┯═╋┊╸	<del></del>		
1	SS6011	Philosophy	3	3					
2	FL6010	English							
Comp	oulsory (15	credits)	15						
3	BF6713	Bio-separation of biological products	2(2-0-0-4)	2					
4	BF6714	Special experiments of Bioengineering	1(0-0-2-2)	1					
5	BF6731	Proteomics	2(2-0-0-4)	2					
6	BF6736	Gene regulation and expression	2(2-0-0-4)	2		1			
7	BF6742	Microbial Metabolism	2(2-0-0-4)	2					
8	BF6761	Monitoring and control of fermenters	3(3-0-0-6)	3					
9	BF6762	Biocatalysts	3(3-0-0-6)	3					
Optio	nal (6 cred	lits)	6		6				
10	BF6122	Product innovation	2(2-1-0-4)						
11	BF6414	Experimental data analysis	2(2-1-0-4)						
12	BF6723	Bioremediation	2(2-0-0-4)				+ 		
13	BF6725	Biofuel	2(2-0-0-4)			┤┤┨	+		
14	BF6726	Probiotic and Prebiotic	2(2-0-0-4)						
15	BF6728	Biopolymer	2(2-0-0-4)				- <u>t</u>		
16	BF6743	Extraction, separation, isolation and evaluation of biological compounds	2(2-1-0-4)						
17	BF5717	Diagnostic kit manufacturing technology	2(2-0-0-4)						
18	BF5718	Recombinant Protein Technology	2(2-0-0-4)				<u> </u>		
19	BF5722	Nano-biomaterials	2(2-0-0-4)						
Prese	ntation (6 c	credits)	6				÷		
20	BF6767	Seminar 1 (or project 1)	2		2				
21	BF6768	Seminar 2 (or project 2)	2		2		<b> </b>		
22	BF6769	Seminar 3 (or project 3)	2				╂┊		
Thesis	s (15 credit	s)	15				-		
23	BF6702	Thesis for master of science	15(0-0-30- 30)			1:	5		

### **HUST-NUT Bioengineering DDP program**

Year	Campus	Criteria	Class Name	NUT	HUST
		General	SS6011 Philosophy		3
			BF6731 -Proteomics		2
			BH67516 = Conorequikicon and expression	2	
			BF6762 = Bioeanilysis	2	
1st	HUST	Compulsory	BF6742 Miterobial metabolism	2	
	4		BF6761 - Monitoring and control of fermentors		3
	a the second		BF6713 - Bioseparation of biological products		2
			BF6714 - Special experiments of Bioengineering		1
		Elective	Elective subjects		6
			00FCC5 Japanese Industrial Development	2	2
		General	Experience		
		General	00FBA5 Technology and Public Policy	2	2
			00FCD5 Gigaku Innovation and Creativity	2	2
			15AGC6 Seminar on Bioengineering 1	2	
			15AGD6 Seminar on Bioengineering 2	2	2
			15AGE6 Seminar on Bioengineering 3	2	
			15AGF6 Seminar on Bioengineering 4	2	2
2nd	NUT Compulsory		15AGA6 Special Experiments of Bioengineering 1	4	
			15AGB6 Special Experiments of Bioengineering 2	4	······································
			17AAI5 Research Integrity	1	
			15AAZ5 Seminar on Bioengineering for foreign	2	
		Elective	students	<u></u>	
			Reserch Project Seminor for Foriegn Students 1	2	2
			Reserch Project Seminor for Foriegn Students 2	4	a ta ang ang ang ang ang ang ang ang ang an
			Credits required for Master's degree	30	45

: NUT will use for the corresponding subjects. : HUST will use for Master's thesis (15 credits).

#### Credits required for Master's degree

University	Credits	Note
NUT	30	General : 6 credits Compulsory : 16 credits Elective : 8 credits
HUST	45	Compulsory : 24 credits Elective : 6 credits Master's thesis : 15 credits

# PROGRAM FOR MASTER SCIENCE IN BIOTECHNOLOGY

#### HUST

### (INTERGRATED PROGRAM)

CONTENT	CODE	SUBJECT	CREDITS	QUANTITY
<b>C</b>	SS6011	Philosophy	3	
General	FL6010	English		Self learning
Compulsory	BF6713	Bioseparation of biological	2	2(2-0-0-4)
(15 credits)		products	<u> </u>	2(2 0-0-7)
	BF6714	Special experiments of Bioengineering	1	1(0-0-2-2)
	BF6731	Proteomics	2	2(2-0-0-4)
	BF6736	Gene regulation and expression	2	2(2-0-0-4)
	BF6742	Microbial Metabolism	2	2(2-0-0-4)
	BF6761	Monitoring and control of fermentors	3	3(3-0-0-6)
	BF6762	Biocatalysis	3	3(3-0-0-6)
Optional	BF6122	Product innovation	2	2(2-1-0-4)
(6 credits)	BF6414	Experimental data analysis	2	2(2-1-0-4)
	BF6723	Bioremediation	2	2(2-0-0-4)
	BF6725	Biofuel	2	2(2-0-0-4)
	BF6726	Probiotic and Prebiotic	2	2(2-0-0-4)
	BF6728	Biopolymer	2	2(2-0-0-4)
	BF6743	Extraction, separation, isolation and evaluation of biological compounds	2	2(2-1-0-4)
	BF5717	Diagnostic kit manufacturing technology	2	2(2-0-0-4)
	BF5718	Recombinant Protein Technology	2	2(2-0-0-4)
	BF5722	Nanobiomaterials	2	2(2-0-0-4)
Presentation	BF6767	Seminar 1 (or project 1)	2	
(6 credits)	BF6768	Seminar 2 (or project 2)	2	
	BF6769	Seminar 3 (or project 3)	2	
Thesis (15 credits)	BF6702	Thesis for master of science	15	15(0-0-30-30)
Total			45	

Responder's detail	
Name (optional): Terisule Nishium Occupation: Associte photoessel	
Establishment: NUT E-mail: thish; gvos. huga oka ut. at.	ir
Nationality: Japan	,
Thank you for your participation in our survey. Please answer the questions below refering to	

1: Strongly disagree 2: Disagree 3: Neutral		4: Agree	5	: Strongl	ly agree		
	1	2	3	4	5		
1. The coherence between <i>Expected learning</i> outcomes and Study program				$\checkmark$			
2. The importantly of 5 criteria in <i>Expected learning</i> of	outcon	nes					
Standard 1				$\lor$			
Standard 2				V			
Standard 3							
Standard 4			V				
Standard 5							
3. The <i>Expected learning outcomes</i> fits well with the industrial demand.			$\vee$				
4. The balance between theory and practice in <i>Study</i> program			$\checkmark$				
5. The balance between generals and specials courses in <i>Study program</i>				$\lor$			
6. Others comments, suggestions (Please specify)							

the grade (1 to 5) by checking X

### HUST MASTER PROGRAMM SURVEY

Responder's detail	1
Name (optional): Tarrulee Kishenva	Occupation: Associale photoessor
Establishment : $/ \cup \cup \overline{)}$	E-mail: this him vos. hajacka at ar jp
Nationality: Tepah	

Thank you for your participation in our survey. Please answer the questions below referring to the grade (1 to 5) by checking X

1: Strongly disagree 2: Disagree 3: Neutral		4: Agree	5.	: Strong	gly agree
	1	2	3	4	5
1. The coherence between <i>Expected learning</i> outcomes and Study program				V	
2. The importantly of 5 criteria in <i>Expected learning</i>	outcom	nes			<u> </u>
Standard 1					V
Standard 2				V	
Standard 3				ν	
Standard 4			V		
3. The <i>Expected learning outcomes</i> fits well with the industrial demand.			V		
4. The balance between theory and practice in <i>Study program</i>				V	
5. The balance between generals and specials courses in <i>Study program</i>			V		
6. Others comments, suggestions (Please specify)				L	

Thank you for your participation

### EXPECTED LEARNING OUTCOMES for Bachelor Bioengineering

Standard 1. Knowledge of a wide range of expertise to adapt well to job's relevant to the field of study, focusing on the ability to apply basic and specific knowledge of biological engineering with biological engineering orientations in industry, environment, medicine, food and biosafety testing:

1.1. The ability to apply mathematic and scientific knowledge to participate in designing, calculating a system, a workshop or a production process of biological products.

1.2. The ability to apply the basics knowledge of biological engineering for research and problems solving.

1.3. The ability to apply basic and specialized knowledge of biological engineering and quality management in combination with practice to identify issues related to technology, equipment and quality in bio-production. Ability to participate in production organization, to design and to evaluate technological solutions, equipment and quality of bio-products.

**Standard** 2. Professional skills, personal skills and personal qualities that allow learning at a higher level, the ability to self-learning to adapt to the continuous development of science and technology:

2.1. The ability to identify technical issues in the context of global economic, environmental and social.

2.2. Possess the scientific methodology of analysis to participate in projects development and implementation in the field of biotechnology.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate of knowledge, skills and attitudes, self-learning and lifelong learning.

2.4. Time management ability.

2.5. Having professional ethics, honesty and sense of responsibility, professional behavior, proactive in planning for their own careers, regularly updating information in the field of biotechnology.

Standard 3. Communication skills, teamwork and international integration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work, TOEIC  $\geq$  500.

Standard 4. Ability to develop ideas, to design, to implement and to operate in industrial and social context:

4.1. Understanding their socials role and responsibility, being aware of the impact of technical application on society, knowledge of laws and regulations in the field of biotechnology, be aware of historical and cultural contexts, be aware of current issues and global development prospects.

4.2. Adhering to the multi-culture of enterprise, mastering the business strategy, objectives and business plans, able to develop technical commercialization idea, able to adapt in different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; applying specific knowledge in design and practice.

Standard 5. Political quality, patriotism and good heath for the construction and protection of the country:

5.1. Sufficient level of political theory according to the general program of the Ministry of Education and Training.

5.2. Certificate of Physical Education and Certificate of Defense Education - Security according to the general program of the Ministry of Education and Training.

<b>.</b>		Code Specialty	Credit (s)		<u> </u>	S	Sem	estr	у У		
N°.	Code	Specially		1	2	3	4	5	6	7	8
Polit	ic theory and	l general law	12	1							
1	SSH1110	Marxism-Leninism I	2(2-1-0-4)	1	2						
2	SSH1120	Marxism-Leninism II	3(2-1-0-6)		1	3					
3	SSH1050	Ho Chi Minh Ideology	2(2-0-0-4)			1		2			
4	SSH1130	Politic orientation of Vietnam Communist	3(2-1-0-6)						3		
5	EM1170	General law	2(2-0-0-4)		2						
Phys	ical educatio	n	05			1		1			
6	PE1014	Theory of physical education (obligatory)	1(0-0-2-0)			1		1	1		
7	PE1024	Swimming (obligatory)	1(0-0-2-0)		1			1			
8		Optional 1	1(0-0-2-0)			1					<b> </b>
9	Optional	Optional 2	1(0-0-2-0)			<u> </u>	1		1		$\square$
10		Optional 3	1(0-0-2-0)						1	<u> </u>	
Mili	tary educatio	on (165 credits)		1							<u> </u>
11	MIL1110	Military orientation of Communist	0(3-0-0-6)		1					<u> </u>	<u> </u>
12	MIL1120	National defense and security	0(3-0-0-6)	-			1		<u> </u>		
13	MIL1130	General military and technique of CKC shotgun.	0(3-0-2-8)	-							
Fore	ign language	•	06						1		<u> </u>
14	FL1100	English I	3(0-6-0-6)	3				1		<u> </u>	<u>†</u>
15	FL1101	English II	3(0-6-0-6)		3			T	1		<u> </u>
Mat	hs and Basic	Sciences	32					1			<u> </u>
16	MI1112	Analytics I	3(2-2-0-6)	3			· ·		1-		
17	MI1122	Analytics II	3(2-2-0-6)		3			1			
18	MI1132	Analytics III	3(2-2-0-6)		1		3				<u> </u>
19	MI1142	Algebra	3(2-2-0-6)	3	1				1	<u> </u>	
20	MI3180	Statistical Probability and Experimental Design	3(3-1-0-6)					3			
21	PH1111	Physics I (Mechanic-thermal)	2(2-0-1-4)		2						
22	PH1121	Physics II (Electrical)	2(2-0-1-4)			2					
23	PH1131	Physics III (Optical)	2(2-0-1-4)				2				
24	IT1140	General informatics	4(3-1-1-8)		4						
25	CH1018	Chemistry I	2(2-1-0-4)	2					Ī		
26	CH3224	Organic Chemistry	2(2-1-0-4)			2		1			
27	CH3081	Physical chemistry	2(2-1-0-4)				2	1			
28	CH3082	Physical chemistry (practical work)	1(0-0-2-2)				1	1		<b> </b>	
Basic	and special	ties in biotechnology	48						-	<b></b>	
29	CH3316	Analytical Chemistry	2(2-1-0-4)			2					
30	CH3318	Analytical Chemistry (Practical work)	1(0-0-2-2)			1		1			
31	EE2012	Electro techniques	2(2-1-0-4)				2				
32	ME2015	Fundamentals of Technical Graphics	3(3-1-0-6)				3			-	
33	BF2701	Fundamentals of Biotechnology	2(1-1-1-4)	1		2		<u>†                                    </u>		<b></b>	

### PROGRAM: BACHELOR OF BIOENGINEERING

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34	BF3711	Process and equipment in biotechnology I	2(1 1 1 4)		ł	1 -	,	I	1	1
35	BF3712	Process and equipment in biotechnology II	2(1-1-1-4)	+ +	-	$- ^{2}$		+		
36	BF3713	Process and equipment in biotechnology III	2(2-1-1-0)	++	-+-		3	$\frac{1}{2}$		ļ
37	BF4725	Techniques for measuring and Automatic control in biotechnology	2(2-0-1-4)					2		2
38	BF4726	Quality product management in biotechnology	2(2-0-0-4)	<u> </u>	+			$\left  - \right $	┝──┥	2
39	BF3714	Process and equipment in biotechnology (Project work)	1(0-2-0-2)					1		
40	BF2702	Biochemistry	4(4-0-0-8)			4				
41	BF2703	Biochemistry (Practical work)	2(0-0-4-4)			2				
42	BF3701	Microbiology I	3(3-0-0-6)				3			
43	BF3702	Microbiology (Practical work)	2(0-0-4-4)	-		_	2			
44	BF3703	Cell biology	2(2-0-1-4)				2			
45	BF3704	Immunology	2(2-0-0-4)					2		
46	BF3705	Genetics and molecular biology	3(2-2-0-6)					3		
47	BF3706	Genetic engineering	2(2-0-1-4)					2		
48	BF3707	Bioinformatics	2(1-0-2-4)				<b> </b>	2		
49	BF3708	Analytical methods in biotechnology	2(2-0-1-4)		1		-	2		
50	BF4727	Project work in biotechnology	2(0-4-0-4)				1	1	2	
http://www.	tional knowle	edge	09		-		1			
51	EM1010	General management	2(2-1-0-4)			-		1		
52	EM1180	Business culture and start-up	2(2-1-0-4)				1	1	2	
53	ED3280	Psychology applicative	2(1-2-0-4)			_	1	+		
54	ED32200	Soft skills	2(1-2-0-4)		-+			1		
55	ED3220	Technological concepts & technical design	2(1-2-0-4)		Ť	-		1		
56	TFX3123	Industrial design	2(1-2-0-4)		T					$\square$
57	BE2020	Technical Writing and Presentation	3(2-2-0-6)							
 Optie	onal for appl	icative orientation: student selects one	16	+ +	-	_		1	1	
comp	oulsory modu	ıle (11 credits)	10		-+			+-	+	$\downarrow$
Mod	ule 1: Oriente	ation Biotechnology Environment	11	_				+	+	<u> </u>
58	BF4701	Biological engineering for waste treatment	3(2-2-0-6)		_		<u> </u>		3	
59	BF4702	Environmental Toxicology	2(2-0-0-4)				-		2	
60	BF4703	Environmental Microbiology	2(2-0-0-4)		_			+-	2	
61	EV4241	Environmental Management	2(2-0-0-4)	$\downarrow$					2	
62	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)						2	+
Mod	ule 2: Orient	ation Biotechnology and Food Technology	11					+-	+-	+
63	BF4705	Fermentation Engineering	3(2-2-0-6)	_				-+		+
64	BF4706	Rapid Methods in Food Industry	2(2-0-1-4)					<u> </u>	$\frac{12}{12}$	+
65	BF4707	Food Microbiology	2(2-0-0-4)				+-		$\frac{1}{2}$	
66	BF4511	Enzymes in Food Technology	2(2-0-0-4)	_			+-	_	$\frac{12}{2}$	
67	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)			╞╌╌┼╴	_	+	$+\frac{2}{}$	
Mod	lule 3: Orien	tation Biotechnology for industry	11			╞╌╌┝				+-
68	BF4705	Fermentation Engineering	3(2-2-0-6)		<u> </u>	╞╌┝			3	
69	BF4709	Downstream processing	2(2-0-0-4)			$\left  - \right $	_		$+^2$	:
70	BF4711	Industrial Microbiology	2(2-0-0-4)		_	+			$+^2$	<u>'</u>
71	BF4712	Enzyme	2(2-0-0-4)		<u> </u>		+		$-\frac{1}{2}$	<u>'</u>
72	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)						2	2

.

Mod	ule 4: Orienta	11							
73	BF4713	Animal cell technology	3(2-2-0-6)					3	
74	BF4714	Molecular diagnostics	2(2-0-1-4)					2	
75	BF4715	Virus culture technology	2(2-0-0-4)			 		2	
76	BF4716	Recombinant DNA technology	2(2-0-0-4)		 			2	
77	BF4717	Recombinant DNA technology (Practical work)	2(0-0-4-4)	_	-			2	
Othe	rs: student se	lects 5 credits	05						
78	BF4718	Techniques obtaining bioactive compounds from plant	2(2-1-0-4)						
79	BF4719	Techniques obtaining bioactive compounds from plant (Practical work)	2(0-0-4-4)						
80	BF4721	Genetically Modified Organism and Application	2(2-0-0-4)						
81	BF4722	Plant Cell and Tissue Culture Technology	2(2-0-0-4)						
82	BF4723	Animal cell technology (Practical work)	2(0-0-4-4)						
83	BF4724	Enzyme technology (Practical work)	2(0-0-4-4)						
84	BF4701	Biological engineering for waste treatment	3(2-2-0-6)				·		
85	BF4702	Environmental Toxicology	2(2-0-0-4)						
86	BF4703	Environmental Microbiology	2(2-0-0-4)						
87	EV4241	Environmental Management	2(2-0-0-4)						
88	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)						
89	BF4705	Fermentation Engineering	3(2-2-0-6)						
90	BF4706	Rapid Methods in Food Industry	2(2-0-0-4)						
91	BF4707	Food Microbiology	2(2-0-0-4)						
92	BF4511	Enzymes in Food Technology	2(2-0-0-4)						
93	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)						
94	BF4709	Downstream processing	2(2-0-0-4)						
95	BF4711	Industrial Microbiology	2(2-0-0-4)				an a Na a		
96	BF4712	Enzyme	2(2-0-0-4)						
97	BF4713	Animal cell technology	3(2-2-0-6)					1	
98	BF4714	Molecular diagnostics	2(2-0-0-4)						
99	BF4715	Virus culture technology	2(2-0-0-4)						
100	BF4716	Recombinant DNA technology	2(2-0-0-4)						
101	BF4717	Recombinant DNA technology (Practical work)	2(0-0-4-4)						
Tech	nique stage a	nd Bachelor thesis	08						
102	BF4781	Technical practice in Bioengineering	2(0-0-6-4)						2
103	BF4791	Bachelor thesis in Bioengineering	6(0-0-12-12)					]	6

### EXPECTED LEARNING OUTCOMES for Master Biotechnology

**Standard 1**. Knowledge of a wide range of expertise to adapt well to job's relevant to the field Biotechnology and able to work independently:

1.1. The ability to apply deep scientific knowledge to solve problems in biotechnology.

1.2. The ability to synthetize and analyses scientific information and its application in research, production.

1.3. The ability to analyses and solve technique problems in production line; capable to apply new techniques and tools of biotechnology.

Standard 2. Professional skills and personal skills to success: work scientifically, good strategic thinking and well adapt to international environment:

2.1. The ability to analyses and evaluate technical issues in the context of global economic, environmental and social.

2.2. Having the scientific methodology of thinking to establish a project, the implementation of a bioprocess.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate.

2.4. Time management and personal project management.

2.5. Having professional ethics, honesty, sense of responsibility, professional behavior, able to update in a selective way the information in the field of biotechnology.

2.6. Professional and scientific working; good systematic and scientific thinking; able to adapt to international scientific activities.

Standard 3. Social skills to integrate in a multidisciplinary collaboration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work, TOEIC  $\geq$  550.

Standard 4. Having the ability to self-learning, to update knowledge and to do scientific research. Ability to apply scientific knowledge to solve real issues:

4.1. Understanding the role of applying technology for the development of society. Understanding of national laws and regulations in biotechnology. Be aware of historical and cultural contexts; be aware of current issues and global development prospects.

4.2. Having the idea of commercialize the scientific products when respecting the culture, objective and business plan of enterprise. Having the ability to adapt to different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; apply scientific knowledge to develop and realize a project.

4.5. Ability of regularly updates knowledge, doing scientific research, writing scientific report; possibility to apply special knowledge and scientific achievements to solve practical issues.

		PROGRAM: MASTER IN	BIOTECHN	OLOGY		
N19	Codo	Subject	Credit(s)		Semester	
IN-	Code	Subject		9	10	11
Gener	al knowled	lge				
1	SS6011	Philosophy	3	3		
2	FL6010	English				
Comp	ulsory (15	credits)	15			
3	BF6713	Bio-separation of biological products	2(2-0-0-4)	2		
4	BF6714	Special experiments of Bioengineering	1(0-0-2-2)	1		
5	BF6731	Proteomics	2(2-0-0-4)	2		
6	BF6736	Gene regulation and expression	2(2-0-0-4)	2		
7	BF6742	Microbial Metabolism	2(2-0-0-4)	2		
8	BF6761	Monitoring and control of fermenters	3(3-0-0-6)	3		1
9	BF6762	Biocatalysts	3(3-0-0-6)	3		
Optio	nal (6 cred	its)	6		6	
10	BF6122	Product innovation	2(2-1-0-4)			
11	BF6414	Experimental data analysis	2(2-1-0-4)			
12	BF6723	Bioremediation	2(2-0-0-4)			
13	BF6725	Biofuel	2(2-0-0-4)			
14	BF6726	Probiotic and Prebiotic	2(2-0-0-4)			
15	BF6728	Biopolymer	2(2-0-0-4)			
16	BF6743	Extraction, separation, isolation and evaluation of biological compounds	2(2-1-0-4)			
17	BF5717	Diagnostic kit manufacturing technology	2(2-0-0-4)		·····	
18	BF5718	Recombinant Protein Technology	2(2-0-0-4)			
19	BF5722	Nano-biomaterials	2(2-0-0-4)			
Prese	ntation (6 d	credits)	6			
20	BF6767	Seminar 1 (or project 1)	2		2	
21	BF6768	Seminar 2 (or project 2)	2		2	
22	BF6769	Seminar 3 (or project 3)	2		2	
Thesis	s (15 credit	s)	15			
23	BF6702	Thesis for master of science	15(0-0-30- 30)			15

### **HUST-NUT Bioengineering DDP program**

Year	Campus	Criteria	Class Name	NUT	HUST
		General	SS6011 Philosophy		3
	Strate we want a strategy of the second s		BF6731 -Proteomics		2
			BP6726 - Generic gulletin in and expression	24-22	2
1st	HUST	Compulsory	Bin 67/452 = Miterelbini miteralberlistin	$\mathbf{P}$	1 - 2 - 2
			BF6761 - Monitoring and control of fermentors		3
	and Salari		BF6713 - Bioseparation of biological products		2
			BF6714 - Special experiments of Bioengineering		1
		Elective	Elective subjects		6
		Commit	00FCC5 Japanese Industrial Development Experience	2	2
		General	00FBA5 Technology and Public Policy	2	2
			00FCD5 Gigaku Innovation and Creativity	2	2
			15AGC6 Seminar on Bioengineering 1	2	
			15AGD6 Seminar on Bioengineering 2	2	2
			15AGE6 Seminar on Bioengineering 3	2	
			15AGF6 Seminar on Bioengineering 4	2	2
2nd	NUT	Compulsory	15AGA6 Special Experiments of Bioengineering 1	4	
			15AGB6 Special Experiments of Bioengineering 2	4	
			17AAI5 Research Integrity	1	
		Flooting	15AAZ5 Seminar on Bioengineering for foreign students	2	
		Liective	Reserch Project Seminor for Foriegn Students 1	2	2
			Reserch Project Seminor for Foriegn Students 2	4	
			Credits required for Master's degree	30	45



: NUT will use for the corresponding subjects. : HUST will use for Master's thesis (15 credits).

#### Credits required for Master's degree

University	Credits	Note
NUT	30	General : 6 credits Compulsory : 16 credits Elective : 8 credits
HUST	45	Compulsory : 24 credits Elective : 6 credits Master's thesis : 15 credits

### PROGRAM FOR MASTER SCIENCE IN BIOTECHNOLOGY

#### HUST

### (INTERGRATED PROGRAM)

CONTENT	CODE	SUBJECT	CREDITS	QUANTITY
<b>a</b> .	SS6011	Philosophy	3	
General	FL6010	English		Self learning
Compulsory	BF6713	Bioseparation of biological	2	2(2-0-0-4)
(15 credits)	DI 0715	products	2	2(2-0-0-4)
	BF6714	Special experiments of Bioengineering	1	1(0-0-2-2)
	BF6731	Proteomics	2	2(2-0-0-4)
	BF6736	Gene regulation and expression	2	2(2-0-0-4)
	BF6742	Microbial Metabolism	2	2(2-0-0-4)
	BF6761	Monitoring and control of fermentors	3	3(3-0-0-6)
	BF6762	Biocatalysis	3	3(3-0-0-6)
Optional	BF6122	Product innovation	2	2(2-1-0-4)
(6 credits)	BF6414	Experimental data analysis	2	2(2-1-0-4)
	BF6723	Bioremediation	2	2(2-0-0-4)
	BF6725	Biofuel	2	2(2-0-0-4)
	BF6726	Probiotic and Prebiotic	2	2(2-0-0-4)
	BF6728	Biopolymer	2	2(2-0-0-4)
	BF6743	Extraction, separation, isolation and evaluation of biological compounds	2	2(2-1-0-4)
	BF5717	Diagnostic kit manufacturing technology	2	2(2-0-0-4)
	BF5718	Recombinant Protein Technology	2	2(2-0-0-4)
	BF5722	Nanobiomaterials	2	2(2-0-0-4)
Presentation	BF6767	Seminar 1 (or project 1)	2	
(6 credits)	BF6768	Seminar 2 (or project 2)	2	
	BF6769	Seminar 3 (or project 3)	2	
Thesis (15 credits)	BF6702	Thesis for master of science	15	15(0-0-30-30)
Total	+		45	

Responder's detail		, í	
Name (optional): iVGUYEN HI HU	Y HANHOccupation:	Lecturer	1
Establishment : $VNUA$	E-mail:	ntthanh.sha	Mug. edu. vn.
Nationality: Victnam.			

Thank you for your participation in our survey. Please answer the questions below refering to the grade (1 to 5) by checking X

1:	Strongly disagree 2: Disagree 3: Neutral		4: Agree		5: Strongl	v agree
		1	2	3	4	5
1.	The coherence between <i>Expected learning</i> outcomes and Study program					·/
2.	The importantly of 5 criteria in <i>Expected learning o</i>	utcom	es			<u> </u>
	Standard 1					V
	Standard 2					V
	Standard 3					V
	Standard 4					V
	Standard 5					V
3.	The <i>Expected learning outcomes</i> fits well with the industrial demand.				$\vee$	
4.	The balance between theory and practice in <i>Study</i> program				$\bigvee$	
5.	The balance between generals and specials courses in <i>Study program</i>					V
6.	Others comments, suggestions (Please specify)		<u> </u>		· · · · · · · · · · · · · · · · · · ·	
	strongly alsagree       2: Disagree       3: Neutral       4: Agree       3: Moligy agree         1       2       3       4       5         The coherence between Expected learning outcomes and Study program					
Í						

### HUST MASTER PROGRAMM SURVEY

Responder's detail Name (optional): Ng Thi Thuy Hart	Occupation:	Lechurer
Establishment : VNUA	E-mail:	ntthank sha inua - ecu - m
Nationality: Viet Nam		

Thank you for your participation in our survey. Please answer the questions below referring to the grade (1 to 5) by checking X

1:	Strongly disagree 2: Disagree 3: Neutral		4: Agree		5: Strong	ly agree
		1	2	3	4	5
1.	The coherence between <i>Expected learning</i> outcomes and Study program					V
2.	The importantly of 5 criteria in <i>Expected learning o</i>	utcom	nes			
	Standard 1					V
	Standard 2					V
	Standard 3					V
	Standard 4					V
3.	The <i>Expected learning outcomes</i> fits well with the industrial demand.					V
4.	The balance between theory and practice in <i>Study</i> program					V
5.	The balance between generals and specials courses in <i>Study program</i>					V
6.	Others comments, suggestions (Please specify)	•	, <b>k</b>			<u> </u>

Thank you for your participation

### EXPECTED LEARNING OUTCOMES for Bachelor Bioengineering

Standard 1. Knowledge of a wide range of expertise to adapt well to job's relevant to the field of study, focusing on the ability to apply basic and specific knowledge of biological engineering with biological engineering orientations in industry, environment, medicine, food and biosafety testing:

1.1. The ability to apply mathematic and scientific knowledge to participate in designing, calculating a system, a workshop or a production process of biological products.

1.2. The ability to apply the basics knowledge of biological engineering for research and problems solving.

1.3. The ability to apply basic and specialized knowledge of biological engineering and quality management in combination with practice to identify issues related to technology, equipment and quality in bio-production. Ability to participate in production organization, to design and to evaluate technological solutions, equipment and quality of bio-products.

Standard 2. Professional skills, personal skills and personal qualities that allow learning at a higher level, the ability to self-learning to adapt to the continuous development of science and technology:

2.1. The ability to identify technical issues in the context of global economic, environmental and social.

2.2. Possess the scientific methodology of analysis to participate in projects development and implementation in the field of biotechnology.

2.3. Being proactive, flexible, creative thinking and able to self-evaluate of knowledge, skills and attitudes, self-learning and lifelong learning.

2.4. Time management ability.

2.5. Having professional ethics, honesty and sense of responsibility, professional behavior, proactive in planning for their own careers, regularly updating information in the field of biotechnology.

Standard 3. Communication skills, teamwork and international integration:

3.1. Ability to work independently and teamwork in a multidisciplinary collaboration.

3.2. Ability to communicate with domestic and foreign partners.

3.3. Ability to use English at work,  $TOEIC \ge 500$ .

Standard 4. Ability to develop ideas, to design, to implement and to operate in industrial and social context:

4.1. Understanding their socials role and responsibility, being aware of the impact of technical application on society, knowledge of laws and regulations in the field of biotechnology, be aware of historical and cultural contexts, be aware of current issues and global development prospects.

4.2. Adhering to the multi-culture of enterprise, mastering the business strategy, objectives and business plans, able to develop technical commercialization idea, able to adapt in different working environments.

4.3. Ability to brain-storming for a research project; participating in the project implementation plan; applying specific knowledge in design and practice.

Standard 5. Political quality, patriotism and good heath for the construction and protection of the country:

5.1. Sufficient level of political theory according to the general program of the Ministry of Education and Training.

5.2. Certificate of Physical Education and Certificate of Defense Education - Security according to the general program of the Ministry of Education and Training.

	T	TROOMAN				S	eme	estry	1		
Nº	Code	Specialty	Credit (s)	1	2	3	4	5	6	7	8
			12								┝╌╟
Politi	c theory and	general law	2(2-1-0-4)		2		 				┼╌╄╴
1	SSH1110	Marxism-Leninism I	3(2-1-0-6)			3	<u> </u>		ļ	ļ	┶╊
2	SSH1120	Marxism-Leninism II	2(2-0-0-4)	_				2			$\downarrow$
3	SSH1050	Ho Chi Minh Ideology	3(2-1-0-6)				T		3		
4	SSH1130	Politic orientation of vietnam Communist	2(2-0-0-4)		2						
5	EM1170	General law	05	-+		1	1			Τ	
Phys	sical education	n	1(0-0-2-0)			+	+	1		1	
6	PE1014	Theory of physical education (obligatory)	1(0-0-2-0)		+	+	+	+-	-	+-	
7	PE1024	Swimming (obligatory)	1(0 - 0 - 2 - 0)		+	+	+	+-	+-	+-	
8	_	Optional 1	1(0-0-2-0)	+-	-	+	+-	+-	+	+-	+1
9	Optional	Optional 2	1(0-0-2-0)			+-	+				+
10		Optional 3	1(0-0-2-0)		+	+	+	+	+	+-	
Mili	itary education	on (165 credits)				+		+	+	+-	+-
11	MIL1110	Military orientation of Communist	0(3-0-0-6)		+-		_	+		+	_
12	MIL1120	National defense and security	0(3-0-0-6)							+	
13	MIL1130	General military and technique of CKC shotgun.	0(3-0-2-8)								
For	eign languag	e	06								
14	FL1100	English I	3(0-6-0-6)	3	5						
15	FL1101	English II	3(0-6-0-6)		3						-
Mat	ths and Basic	Sciences	32		-		-				
16	MI1112	Analytics I	3(2-2-0-6)	3		+-			+-		
17	MI1122	Analytics II	3(2-2-0-6)		3				+		
18	MI1132	Analytics III	3(2-2-0-6)		+-				+-		
19	MI1142	Algebra	3(2-2-0-6)	3	+		+			+-	+
20	MI3180	Statistical Probability and Experimental Design	3(3-1-0-6)		+-	+-		3		+	
21	PH1111	Physics I (Mechanic-thermal)	2(2-0-1-4)	-+-	$\frac{1}{2}$	+	+-			+-	
22	PH1121	Physics II (Electrical)	$2(2 \circ 1 + 1)$ 2(2-0-1-4)		- 2	-	+			+-	
23	PH1131	Physics III (Optical)	2(2 - 0 - 1 - 4)		+	4	+-				
24	IT1140	General informatics	4(3-1-1-8)			+					
25	CH1018	Chemistry I	$-\frac{1}{2(2+0,4)}$	+	4	┽	+				
26	CH3224	Organic Chemistry	2(2-1-0-4)	$+^{2}$	+				<u> </u>	_	
27	CH3081	Physical chemistry	2(2-1-0-4)	+		2	<u> </u>	1			1
28	CH3082	Physical chemistry (practical work)	2(2-1-0-4)	+			2	-			
Basic	and specialt	ies in biotechnology	1(0-0-2-2)				1				
29	CH3316	Analytical Chemistry	48				<u> </u>				
30	CH3318	Analytical Chemistry (Practical work)	2(2-1-0-4)	+		2					
31	EE2012	Electro techniques	1(0-0-2-2)	<u> </u>		1					<u> </u>
32	ME2015	Fundamentals of Technical Graphics	2(2-1-0-4)	1			2			<u> </u>	
33	BF2701	Fundamentals of Biotechnology	3(3-1-0-6)				3				
			2(1-1-1-4)			2					┝ <b>─</b> ─┙

# PROGRAM: BACHELOR OF BIOENGINEERING

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3	4 BF3711	Dros									
3	5 BF3712	Process and equipment in biotechnology I	1								
36	 	Process and equipment in biotechnology I	2(1-1-1-4)		1	1	12	,	1	1	t
	BF3/13	Process and equipment in biotechnology III	3(2-1-1-6)		T	7	+	3	+		+
37	BF4725	Techniques for measuring and Automatic	2(2-1-0-4)				1-	+-	2		+
38	BF4726	Quality product	2(2-0-1-4)					T	+	+	1-1
39	BE2714	Process and again	2(2-0-0-4)		+	┼			+	+	
	Br3/14	(Project work)	1(0-2-0-2)	-{	┼──			┼──	+	+	2
40	BF2702	Biochemistry							1		
41	BF2703	Biochemistry (Practical work)	4(4-0-0-8)	+			4				
42	BF3701	Microbiology I	3(3,0,0,6)	+			2				
43	BF3702	Microbiology (Practical work)	3(3-0-0-6)	+				3	L		
44	BF3703	Cell biology	2(0-0-4-4)	$\left  - \right $				2			
45	BF3704	Immunology	2(2-0-1-4)	┝──┤				2			
46	BF3705	Genetics and molecular biology	3(2-2-0-4)	┤╴┥		-+			2		
47	BF3706	Genetic engineering	$\frac{3(2-2-0-0)}{2(2-0-1,4)}$	┝╌┤		-+			3		
48	BF3707	Bioinformatics	2(1-0-2, 4)			-+			2		
49	BF3708	Analytical methods in biotechnology	2(2-0-1,4)	┝╼╌┼					2		
50	BF4727	Project work in biotechnology	$\frac{2(2-0-1-4)}{2(0-4-0-4)}$		-+			_	2	_	
Addi	tional knowl	edge	09							2	
51	EM1010	General management	2(2-1-0-4)					-			
52	EM1180	Business culture and start-up	2(2-1-0-4)			-+-				$\rightarrow$	
53	ED3280	Psychology applicative	$\frac{2(2-1-0-4)}{2(1-2-0-4)}$				-+		-+	2	
54	ED3220	Soft skills	2(1-2-0-4)					-+			_
55	ET3262	Technological concepts & technical design	2(1-2-0-4)		-+		-+	-	$\rightarrow$		_
56	TEX3123	Industrial design	2(1-2-0-4)		+						_
57	BF2020	Technical Writing and Presentation	3(2-2-0-6)								
Optic	onal for appl	icative orientation: student selects one	16		1		-			$\neg$	
comp	ulsory modu	ile (11 credits)	10								
Modi	ıle 1: Orienta	tion Biotechnology Environment								_+	$\neg$
58	BF4701	Biological engineering for waste treatment	3(2-2-0-6)				-			3	
59	BF4702	Environmental Toxicology	2(2-0-0-4)		-+		-+			2	
60	BF4703	Environmental Microbiology	2(2-0-0-4)	$\left  - \right $						$\frac{2}{2}$	
61	EV4241	Environmental Management	2(2-0-0-4)	$\left  - \right $						2	
62	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)								
Mod	ule 2: Orient	ation Biotechnology and Food Technology	11							1	
63	BF4705	Fermentation Engineering	3(2-2-0-6)	+			<u> </u>		+	2	
64	BF4706	Rapid Methods in Food Industry	2(2-0-1-4)					+	+	$\frac{2}{2}$	
65	BF4707	Food Microbiology	2(2-0-0-4)	+		<u> </u>		+	+	2	
66	BF4511	Enzymes in Food Technology	2(2-0-0-4)	+			┼──	+	1	2	
67	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)	+-		+	+	-	+	+	
Mo	tule 3: Orien	tation Biotechnology for industry	2(2.2.0.6)		+	+	+	+	+-	3	
68	BF4705	Fermentation Engineering	3(2-2-0-0)	+-	+-	+-	+	+-	+	2	$\left  \right $
69	BF4709	Downstream processing	2(2-0-0-4)		+	+	+	+-	+-	2	$\left  \right $
70	BF4711	Industrial Microbiology	2(2-0-0-4)	-+	+	+	+	+		2	$\uparrow \neg \uparrow$
71	BF4712	Enzyme	2(2-0-0-4)		-+-	+	+			2	
72	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-7)								

Made	le 4: Orienta	tion Molecular biology and cell Engineering			┼─┼	-+	+	3	t
72	BF4713	Animal cell technology	3(2-2-0-6)		+-+		+	2	t
7.5	BF4714	Molecular diagnostics	2(2-0-1-4)		+-+			2	-
74	BF4715	Virus culture technology	2(2-0-0-4)					$\frac{2}{2}$	_
75 76	BE4716	Recombinant DNA technology	2(2-0-0-4)		+	-+-			
70	BF4717	Recombinant DNA technology (Practical work)	2(0-0-4-4)					2	
Othe	ers: student s	elects 5 credits	05						
78	BF4718	Techniques obtaining bioactive compounds from plant	2(2-1-0-4)						
79	BF4719	Techniques obtaining bioactive compounds from plant (Practical work)	2(0-0-4-4)		_				┝
80	BF4721	Genetically Modified Organism and Application	2(2-0-0-4)						-
81	BF4722	Plant Cell and Tissue Culture Technology	2(2-0-0-4)	_∔	_				ļ
82	BF4723	Animal cell technology (Practical work)	2(0-0-4-4)			$\vdash$			ł
83	BF4724	Enzyme technology (Practical work)	2(0-0-4-4)						+
84	BF4701	Biological engineering for waste treatment	3(2-2-0-6)				_		1
85	BF4702	Environmental Toxicology	2(2-0-0-4)						
86	BF4703	Environmental Microbiology	2(2-0-0-4)						
87	EV4241	Environmental Management	2(2-0-0-4)						
88	BF4704	Biological Engineering for Waste treatment (Practical work)	2(0-0-4-4)						
89	BF4705	Fermentation Engineering	3(2-2-0-6)						
90	BF4706	Rapid Methods in Food Industry	2(2-0-0-4)						Ī
91	BF4707	Food Microbiology	2(2-0-0-4)						1
92	BF4511	Enzymes in Food Technology	2(2-0-0-4)						ł
93	BF4708	Fermentation Engineering (Practical work)	2(0-0-4-4)			+			┨
94	BF4709	Downstream processing	2(2-0-0-4)	+		+			+
95	BF4711	Industrial Microbiology	2(2-0-0-4)			+	_	+	$\frac{1}{1}$
96	BF4712	Enzyme	2(2-0-0-4)	+		┼╌┼	-+-		$\frac{1}{1}$
97	BF4713	Animal cell technology	3(2-2-0-6)	┼╌┼╴		┼──┼			╀
98	BF4714	Molecular diagnostics	2(2-0-0-4)	┼╌┼╴		+		+	ł
99	BF4715	Virus culture technology	2(2-0-0-4)	+		┼──┼╴			ļ
100	BF4716	Recombinant DNA technology	2(2-0-0-4)	┼╌┼╸		┝╌╴┝			╞
101	BF4717	Recombinant DNA technology (Practical work)	2(0-0-4-4)	╞╌┼╸	-		-+-	+	ŀ
Tecl	nique stage	and Bachelor thesis	08	┟╌┼╴				+	L
102	BF4781	Technical practice in Bioengineering	2(0-0-6-4)	┝					
103	BF4791	Bachelor thesis in Bioengineering	6(0,0,12,12)						

Bachelor of Bioengineering