Curriculum Framework for Robots and Artificial Intelligence

No.	Course Code	Area / Course Title	Total Cr.	Credit Components					Sem.	Prereq. Code	Prior Course
				Lec.	Prac./Lab	Disc./Assign.	Proj.	Intern.			
9.1		**General Education**									
9.1.1		***Social Sciences and Humanities***	***19.0***								
9.1.1.1		*Compulsory*	*15.0*								
1	LP6024	Marxist-Leninist Philosophy	3	3	0	0	0	0	1		
2	LP6025	Marxist-Leninist Political Economy	2	2	0	0	0	0	2		
3	LP6026	Scientific Socialism	2	2	0	0	0	0	3		
4	LP6027	History of the Communist Party of Vietnam	2	2	0	0	0	0	6		
5	LP6022	Ho Chi Minh Thought	2	2	0	0	0	0	4		
6	LP6021	Introduction to Law	2	2	0	0	0	0	7		
7	BS6046	Intercultural Communication	2	2	0	0	0	0	6		
9.1.1.2		*Electives (select one course from Group 1 and one from Group 2)*	*4.0*								
Tc1		**Group 1**	**2.0**								
1	BS6047	Introduction to Scientific Research	2.0	2	0	0	0	0	6		
2	SE6218	Introduction to Economics	2.0	2	0	0	0	0	6		
3	SE6257	Project Management	2.0	2	0	0	0	0	6		
4	BS6048	Labor Relations and Employment	2.0	2	0	0	0	0	6		
5	BS6049	Humans and the Environment	2.0	2	0	0	0	0	6		
6	SM6186	Professional Work Practices	2.0	2	0	0	0	0	6		
Tc2		**Group 2**	**2.0**								
1	BS6050	Introduction to Music	2.0	2	0	0	0	0	7		
2	BS6051	Introduction to Art Studies	2.0	2	0	0	0	0	7		

No.	Course Code	Area / Course Title	Total Cr.	Credit Components					Sem.	Prereq. Code	Prior Course
				Lec.	Prac./Lab	Disc./Assign.	Proj.	Intern.			
3	BS6052	Introduction to Fine Arts	2.0	2	0	0	0	0	7		
9.1.2	***Select one of five foreign language programs***		***10.0***	***10***	***0***	***0***	***0***	***0***			
		Chinese Language Program									
	SL6347	*Chinese 1*	5.0	5	0	0	0	0	4		
	SL6348	*Chinese 2*	5.0	5	0	0	0	0	5		
		Korean Language Program									
	SL6351	*Korean 1*	5.0	5	0	0	0	0	4		
	SL6352	*Korean 2*	5.0	5	0	0	0	0	5		
		Japanese Language Program									
	SL6349	*Japanese 1*	5.0	5	0	0	0	0	4		
	SL6350	*Japanese 2*	5.0	5	0	0	0	0	5		
		English Language Program									
	SL6325	*English for Mechanical Engineering 1*	5.0	5	0	0	0	0	4		
	SL6326	*English for Mechanical Engineering 2*	5.0	5	0	0	0	0	5		
		German Language Program									
	FL6582	*German 1*	5.0	5	0	0	0	0	4		
	FL6583	*German 2*	5.0	5	0	0	0	0	5		
9.1.3		***Natural Sciences***	***18.0***								
9.1.3.1		*Compulsory*	*12.0*	*13*	*2*	*0*	*0*	*0*			
1	BS6038	Calculus	3.0	3	0	0	0	0	1		
2	BS6040	Engineering Mathematics	3.0	3	0	0	0	0	2		
3	BS6042	Probability and Statistics	3.0	3	0	0	0	0	3		
4	BS6054	General Physics	3.0	2	1	0	0	0	1		
9.1.3.2		*Elective*	*6.0*								

No.	Course Code	Area / Course Title	Total Cr.	Credit Components					Sem.	Prereq. Code	Prior Course
				Lec.	Prac./Lab	Disc./Assign.	Proj.	Intern.			
1	BS6039	Numerical Methods	3.0	3	0	0	0	0	3		
2	SC6221	Numerical Methods in Programming	3.0	3	0	0	0	0	3		
3	SC6223	Discrete Mathematics	3.0	3	0	0	0	0	3		
4	SC6245	Optimization	3.0	3	0	0	0	0	3		
5	BS6037	Linear Algebra	3.0	3	0	0	0	0	3		
6	CT6279	General Chemistry	3.0	2	1	0	0	0	3		
7	BS6041	Physics II	3	3	0	0	0	0	3		
9.1.4		***Free Electives***									
9.1.4.1		***Compulsory***									
	SC6201	Digital Competency Development	3.0	2	1	0	0	0	6		
9.1.4.2		***Elective***									
9.1.5		***National Defense and Security Education***	***8.5***						***1***		
		In accordance with Circular No. 05/2020/TT-BGDDT dated March 18, 2020									
9.1.6		***Physical Education***	***4.0***								
		In accordance with the Physical Education Training Regulations promulgated under Decision No. 957/QD-DHCN dated August 8, 2016, of Hanoi University of Industry									
9.2		**Professional Education**	***68***								
9.2.1		***Field Foundations***	***36.0***								

No.	Course Code	Area / Course Title	Total Cr.	Credit Components					Sem.	Prereq. Code	Prior Course
				Lec.	Prac./Lab	Disc./Assign.	Proj.	Intern.			
9.2.1.1		*Compulsory*									
1	SM6050	Engineering Drawing	3	3	0	0	0	0	1		
2	SC6208	Programming Techniques	3	2	1	0	0	0	2		
3	SM6176	Industrial Safety and Environment	2	2	0	0	0	0	3		
4	SEE6164	Electrical and Electronic Engineering	3	2	1	0	0	0	2		
9.2.1.2		*Elective*									
9.2.2		***Discipline Group Foundations***									
9.2.2.1		*Compulsory*									
1	SM6178	Engineering Mechanics	3	3	0	0	0	0	2		
2	SM6055	Strength of Materials	2	2	0	0	0	0	3	SM6178	
3	SM6048	Introduction to Engineering	2	2	0	0	0	0	2		
4	SM6138	Basic Mechanical Engineering Practice	2	0	2	0	0	0	1		
5	SM6049	Introduction to Engineering Project	1	0	0	0	1	0	2		
9.2.2.2		*Elective*									
9.2.3		**Major Foundations**									
9.2.3.1		*Compulsory*									
1	SM6058	Theory of Mechanisms and Machine Elements	2	2	0	0	0	0	4		
2	SM6001	General Mechanical Engineering	2	2	0	0	0	0	1		
3	SM6059	Tolerances and Measurement Techniques	2	2	0	0	0	0	3		
4	SM6205	Fundamentals of Automatic Systems	3	2	0	1	0	0	3	BS6038	
5	SM6153	Tolerances and Measurement Practice	1	0	1	0	0	0	3		
6	SM6195	Computer-Aided Design (CAD)	2	0	2	0	0	0	4	SM6050	

No.	Course Code	Area / Course Title	Total Cr.	Credit Components					Sem.	Prereq. Code	Prior Course
				Lec.	Prac./Lab	Disc./Assign.	Proj.	Intern.			
9.2.3.2		*Elective*	*3.0*						*4*		
1	SM6116	Data Structures and Applied Algorithms	3	2	0	1	0	0	4		
2	SEE6180	Microprocessors and Computer Architecture	3	2	1	0	0	0	4		
3	SC6211	Object-Oriented Programming	3	2	1	0	0	0	4		
4	SEE6181	Digital Signal Processing	3	2	1	0	0	0	4		
9.2.4		***Specialization***	***32.0***								
9.2.4.1		*Compulsory*	*28.0*	*12*	*6*	*2*	*4*	*0*			
1	SM6096	Sensors and Measurement Systems	2.0	2	0	0	0	0	4	SEE6164	
2	SM6118	Sensors and Measurement Systems Laboratory	1.0	0	1	0	0	0	4		
3	SM6119	Hydraulic and Pneumatic Automation Systems	2.0	2	0	0	0	0	4		
4	SM6120	Hydraulic and Pneumatic Automation Systems Practice	1.0	0	1	0	0	0	5		
5	SM6128	Artificial Intelligence in Robotics	2	2	0	0	0	0	5		
6	SM6184	Measurement and Control Course Project	2.0	0	0	0	2	0	5		
7	SM6129	Fundamentals of Robotics Engineering	2.0	2	0	0	0	0	4		
8	SM6198	Robot Modeling and Control	3.0	2	0	1	0	0	5	SM6178	
9	SM6199	Robot Design	3	2	0	1	0	0	6		
10	SM6125	Computer Vision	2	2	0	0	0	0	5		

No.	Course Code	Area / Course Title	Total Cr.	Credit Components					Sem.	Prereq. Code	Prior Course
				Lec.	Prac./Lab	Disc./Assign.	Proj.	Intern.			
11	SM6200	Robotics and Artificial Intelligence Project	2	0	0	0	2	0	7	SM6205	
12	SM6201	Artificial Intelligence Practice	2	0	2	0	0	0	6		
13	SM6130	Robot Programming	2	0	2	0	0	0	4	SC6208	
14	SM6182	Robotics Practice	2	0	2	0	0	0	7	SM6176	
9.2.4.2		*Elective*	*4.0*								
1	SM6124	Mobile Robotics	2.0	2	0	0	0	0	6		
2	SM6132	Collaborative Robots	2	2	0	0	0	0	7		
3	SM6133	Deep Learning	2	2	0	0	0	0	7		
4	SM6126	Machine Learning	2	2	0	0	0	0	6		
5	SM6121	Actuators and Control	2	2	0	0	0	0	6		
6	SM6123	Automation Engineering	2	2	0	0	0	0	6		
7	SM6202	Automation Practice	2	0	2	0	0	0	7		
8	SM6187	Mechatronics Practice	2	0	2	0	0	0	7		
9	SM6131	Embedded Systems and IoT Programming	2	0	2	0	0	0	7		
10	SM6127	Applied Python Programming	2	0	2	0	0	0	6		
9.3		**Free Electives**	***2***								
9.3.1		***Compulsory***	2								
1	SE6209	Innovation and Entrepreneurial Thinking	2	2	0	0	0	0	7		
9.3.2		**Electives (select one of five foreign language program groups)**									

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				Lec.	Prac./Lab	Disc./Assign.	Proj.	Intern.			
		Chinese Language Program									
	FL6560	*Basic Chinese 1*[1]	5	5	0	0	0	0	1		
	FL6561	*Basic Chinese 2*	5	5	0	0	0	0	2		