

## CURRICULUM

*(Issued under Decision No. .... /QD-SIU dated... 2019  
of the Chancellor of the Saigon International University)*

**Program:** Bachelor of Computer Science  
**Level:** Undergraduate  
**Mode of Study:** Full-time  
**Major:** Computer Science  
**Code:** 7480101  
**Concentrations:** Computer Science, Software Engineering

### 1. Programme Objectives (POs):

#### 1.1. General Objective:

The program aims to train the top international-standard information technology engineers in Vietnam, meeting the demand for human resources in the domestic, regional and international information technology industry.

#### 1.2. Detailed Objectives:

- **PO1:** Students obtain basic knowledge of natural sciences, social sciences, humanities, politics, national defense and security and physical education; foreign language skills and soft skills, meeting the requirements in an international working environment.
- **PO2:** Students obtain the ability to apply professional knowledge both in theory and practice in solving real-life problems in the field of computer science; obtain the ability to propose ideas, solution and develop information technology applications in a scientific and effective way
- **PO3:** Students obtain the ability to implement self-study and self-research in order to develop their professional skills; obtain the ability to continue their study to higher levels; have a sense and spirit of entrepreneurship in the fields of Computer Science.
- **PO4:** Students obtain professional working attitude and skills in accordance with

international standards; have the spirit of law compliance and self-responsibility, work ethics, the desire to learn and maintain a lifelong learning.

## 2. Program Learning Outcomes (PLOs):

PLOs	PLOs
<b>Knowledge</b>	<p><b>PLO1:</b> Being able to apply the basic knowledge of Mathematics as a tool to solve problems in the field of computer science effectively and scientifically.</p> <p><b>PLO2:</b> Being able to apply knowledge in foreign languages, philosophy, politics, law and social science to integrate and develop the quality of a global citizen.</p> <p><b>PLO3:</b> Being able to explain the principles of organization and operation of hardware/software systems and computer networks.</p> <p><b>PLO4:</b> Being able to manage information technology projects such as designing, developing, installing, operating and maintaining software systems</p> <p><b>PLO5:</b> Understand the approaches using computational models and modern technology in proposing smart and effective solutions.</p>
<b>Skills</b>	<p><b>PLO6:</b> Being able to detect and solve problems related to software, computers and information systems</p> <p><b>PLO7:</b> Being able to apply suitable calculation tools and models to design smart and modern applications.</p>

PLOs	PLOs
	<p><b>PLO8:</b> Being able to evaluate approaches in selecting, designing solutions to solve problems in the field of computer science in an effective manner.</p> <p><b>PLO9:</b> Being able to present and disseminate knowledge of solutions in computer science during the performance of specific tasks.</p> <p><b>PLO10:</b> Obtaining foreign language ability of at least TOEIC 500</p>
<p><b>Levels of autonomy and responsibility</b></p>	<p><b>PLO11:</b> Being able to plan, coordinate and manage information technology projects through teamwork.</p> <p><b>PLO12:</b> Being able to self-direct, synthesize information, make professional conclusions and defend personal opinions.</p> <p><b>PLO13:</b> Having a sense of self-responsibility and willing to take responsibility for the team during the implementation of information technology projects.</p> <p><b>PLO14:</b> Having professional ethics, collective spirit, honesty, progressive, eager to learn and self-study to improve professional skills in the compliance with domestic and international laws.</p>

**3. Training duration: 4 years**

**4. Number of credits: 132 credits**

**5. Admission requirements:**

Follow the current Admissions Regulations issued by the Ministry of Education and Training and the Admission Schemes issued by the Saigon International University.

**6. Academic procedure and graduation requirements:**

*6.1. Academic procedure:*

Follow the current Regulations on academic affairs issued by the Ministry of Education and Training and the Saigon International University.

## 6.2. Graduation requirements:

Follow the current Regulations on academic affairs issued by the Ministry of Education and Training and the Saigon International University.

## 7. Evaluation methods:

Follow the current Regulation on academic affairs issued by the Saigon International University.

## 8. Content:

### 8.1. Frame:

Knowledge block		Number of credit	Percentage %
<b>1. General knowledge</b>		<b>52</b>	<b>39.39</b>
1.2.	Politics	11	8.33
1.2.	Science	14	10.61
1.3.	Foreign language	13	9.85
1.4.	Informatics	5	3.79
1.5.	Culture	9	6.82
<b>2. Professional knowledge</b>		<b>70</b>	<b>53.03</b>
2.1.	Foundation knowledge	55	41.67
2.2.	Specialized knowledge	15	11.36
<b>3. Internship and graduation thesis</b>		<b>10</b>	<b>7.58</b>
<b>Total:</b>		<b>132</b>	<b>100</b>

### 8.2. Detailed content:

No	Code	Name of course		Num of cred	Allocation					Prereq
		Vietnamese	English		Total	Theo	Prac /Lab	Proj	TT	
<b>I.GENERAL KNOWLEDGE</b>				<b>52</b>						
<b>I.1. Politics</b>				<b>11</b>						
I.1.0 1	2GEN 0011	Triết học Mác - Lênin	Philosophy of Marxism and Leninism	3	45	45				
I.1.0 2	2GEN 0012	Kinh tế chính trị Mác - Lênin	Political Economics of Marxism and Leninism	2	30	30				
I.1.0 3	2GEN 0013	Chủ nghĩa Xã hội khoa học	Scientific Socialism	2	30	30				
I.1.0 4	2GEN 0007	Tư tưởng Hồ Chí Minh	HCM Ideology	2	30	30				
I.1.0 5	2GEN 0014	Lịch sử Đảng Cộng sản Việt Nam	History of The Communist Party of Vietnam	2	30	30				

No	Code	Name of course		Num of cred	Allocation					Prereq
		Vietnamese	English		Total	Theo	Prac /Lab	Proj	TT	
<b>I.2. Science</b>				<b>14</b>						
<b>Compulsory</b>				<b>11</b>						
I.2.0 1	2GEN 0008	Pháp luật đại cương	General Laws	2	30	30				
I.2.0 2	2SOC 11494	Toán cao cấp 1	Calculus 1	3	45	45				
I.2.0 3	2SOC 1496	Toán cao cấp 2	Calculus 2	3	45	45				2SOC 11494
I.2.0 4	2SOC 2485	Toán rời rạc	Discrete Mathematics	3	45	45				
<b>Elective (03 credits)</b>				<b>3</b>						
I.2.0 5	2BUS 11440	Xác suất thống kê	Probability & Statistics	3	45	45				
I.2.0 6	2SCE 1104	Lý	Physics	3	45	45				
I.2.0 7	2SCE 1113	Hoá	Chemistry	3	45	45				
<b>I.3. Foreign language</b>				<b>13</b>						
I.3.0 1	2LAN 11453	English Proficiency 1	English Proficiency 1	4	90	30	60			2LAN 11452
I.3.0 2	2LAN 11454	English Proficiency 2	English Proficiency 2	4	90	30	60			2LAN 11453
I.3.0 3	2LAN 11455	English Proficiency 3	English Proficiency 3	5	90	60	30			2LAN 11454
<b>I.4. Informatics</b>				<b>5</b>						
I.4.0 1	2GEN 1094	Corel Draw	Corel Draw	2	45	15	30			
I.4.0 2	2GEN 1095	Access	Access	3	75	15	60			
<b>I.5. Culture</b>				<b>9</b>						
<b>Compulsory</b>				<b>6</b>						
I.5.0 1	2SOC 11490	Văn hoá Mỹ	American Culture	3	45	45				
I.5.0 2	2ENG 11492	Viết văn Anh	English Expository Writing	3	45	45				2ENG 11491
<b>Elective (03 credits)</b>				<b>3</b>						
I.5.0 3	2ENG 11491	Viết luận Anh	English Composition	3	45	45				
I.5.0 4	2ENG 11467	Văn học Mỹ	Multi Ethnic Literature	3	45	45				
I.5.0 5	2ENG 11405	Tiểu thuyết Anh thế kỷ 20	20 <sup>th</sup> Century British Novels	3	45	45				
<b>II. PROFESSIONAL KNOWLEDGE</b>				<b>80</b>						

No	Code	Name of course		Num of cred	Allocation					Prereq
		Vietnamese	English		Total	Theo	Prac /Lab	Proj	TT	
<b>II.1. Foundation knowledge</b>				<b>55</b>						
II.1.01	CTS2204	Công tác kỹ sư Công nghệ thông tin	Introduction to Information Technology Engineers	2	30	30				
II.1.02	2CTS1408	Cơ sở lập trình 1	Introduction to Programming 1	3	60	30	30			
II.1.03	2CTS2416	Cơ sở lập trình 2	Introduction to Programming 2	3	60	30	30			2CTS1408
II.1.04	CTS5324	Lập trình Python	Python Programming	3	60	30	30			
II.1.05	2CTS2477	Kiến trúc máy tính	Computer Architecture	3	60	30	30			
II.1.06	2CTS1421	Hệ điều hành	Operating Systems	3	60	30	30			
II.1.07	2CTS2475	Cấu trúc dữ liệu và giải thuật	Algorithms And Programming Techniques	3	60	30	30			2CTS2416
II.1.08	2CTS2417	Lập trình hướng đối tượng	Object-Oriented Programming	3	60	30	30			2CTS2416
II.1.09	2CTS3412	Cơ sở dữ liệu	Database System	3	60	30	30			
II.1.10	2CTS2432	Mạng máy tính và ứng dụng	Computer Networks & Applications	3	60	30	30			2CTS1421
II.1.11	CTS5313	Lập trình Windows	Windows Programming	3	60	30	30			2CTS2417
II.1.12	2CTS2402	Trí tuệ nhân tạo	Artificial Intelligence	3	60	30	30			2CTS2416
II.1.13	CTS5318	Bảo mật thông tin	Information security	3	60	30	30			2CTS2417
II.1.14	2BAS0007	Phương pháp nghiên cứu khoa học	Methods of scientific research	2	30	30				
II.1.15	CTS6326	Đồ án cơ sở	Project	3	45			45		
II.1.16	CTS2484	Phân tích thiết kế hệ thống thông tin	Analysis of Information System Design	3	60	30	30			2CTS3412
II.1.17	2CTS4422	Lập trình ứng dụng web	Web Applications Engineering	3	60	30	30			2CTS3412
II.1.18	2CTS4336	Lập trình thiết bị di động	Mobile Data Networking	3	60	30	30			2CTS2417

No	Code	Name of course		Num of cred	Allocation					Prereq
		Vietnamese	English		Total	Theo	Prac /Lab	Proj	TT	
II.1.19	CTS6329	Lập trình Mạng máy tính	Computer Network Programming	3	60	30	30			2CTS2417
<b>II.2. Specialized knowledge</b>				<b>15</b>						
<b>II.2.1. Computer Science</b>										
<b>Compulsory</b>				<b>9</b>						
II.2.1.01	CTS7339	Nhập môn Máy học	Introduction to Machine Learning	3	60	30	30			2CTS2475
II.2.1.02	CTS7341	Nhập môn thị giác máy tính	Introduction to Computer Vision	3	60	30	30			CTS5324
II.2.1.03	CTS7345	Công nghệ Internet Of Things	Internet of Things Technology	3	60	30	30			2CTS2432
<b>Elective (choose 2 among 4 courses)</b>				<b>6</b>						
II.2.1.04	CTS7343	Lập trình Hệ thống nhúng	Embedded Systems Design	3	60	30	30			2CTS2477
II.2.1.05	CTS7347	Robotics và ứng dụng	Robotics and Applications	3	60	30	30			2CTS2416
II.2.1.06	CTS7350	Truy vấn thông tin đa phương tiện	Query Multimedia Information	3	60	30	30			CTS5324
II.2.1.07	CTS7351	Xử lý âm thanh và tiếng nói	Sound and Voice Processing	3	60	30	30			2CTS2475
<b>II.2.2. Software Engineering</b>										
<b>Compulsory</b>				<b>9</b>						
II.2.2.01	2CTS4361	Kiểm thử phần mềm	Software Testing	3	60	30	30			2CTS2416
II.2.2.02	CTS7234	Công nghệ phát triển phần mềm tiên tiến	Advanced Software Development Technology	3	60	30	30			2CTS2417
II.2.2.03	2CTS2409	Công nghệ phần mềm	Software Technology	3	45	45				CTS2484
<b>Elective (choose 2 among 4 courses)</b>				<b>6</b>						
II.2.2.04	2CTS4332	Nhập môn lập trình game	Introduction To Game Programming	3	60	30	30			2CTS2417
II.2.2.05	2CTS4324	Lập trình Java	Java Programming	3	60	30	30			2CTS2417
II.2.2.06	2CTS4321	Quản lý dự án công nghệ thông tin	Information Technology Project Management	3	45	45				

No	Code	Name of course		Num of cred	Allocation					Prereq
		Vietnamese	English		Total	Theo	Prac/Lab	Proj	TT	
II.2.2.07	CTS7353	Big Data	Big Data	3	60	30	30			2CTS3412
<b>II.3. Internship and graduation thesis</b>				<b>10</b>						
II.3.01	2CTS8331	Thực tập tốt nghiệp	Graduation Internship	3	45				45	
II.3.02	2CTS8749	Khoá luận tốt nghiệp	Graduation Thesis	7	105			105		CTS6326
<b>III. UNCUMMULATIVE KNOWLEDGE</b>				<b>21</b>						
<b>Compulsory, uncumulative</b>				<b>21</b>						
III.1.01	2LAN11450	English Skill 1	English Skill 1	4	90	30	60			
III.1.02	2LAN11451	English Skill 2	English Skill 2	4	90	30	60			2LAN11450
III.1.03	2LAN11452	English Skill 3	English Skill 3	4	90	30	60			2LAN11451
III.1.04	2GEN1091	Word & Powerpoint	Word & Powerpoint	2	45	15	30			
III.1.05	2GEN1093	Excel	Excel	2	45	15	30			2GEN1091
III.1.06	2GEN0002	Giáo dục thể chất	Physical Education	5	150		150			
<b>IV. NATIONAL DEFENSE AND SECURITY EDUCATION, PHYSICAL EDUCATION (according to regulations of the Ministry of Education and Training)</b>				<b>11</b>						
<b>Compulsory, uncumulative</b>				<b>11</b>						
IV.1.01	2GEN0001	Giáo dục quốc phòng	Defense Education	11	165	165				

### 8.3. Teaching plan (expected):

No	Code	Name of course	Num of cre	Num of ped	Allocation				Note
					Theo	Prac/Lab	Proj	TT	
<b>Semester 1</b>									
1	2LAN11450	English Skill 1	4	90	30	60			Unaccumulated
2	2GEN0002	Physical Education	1	30		30			Unaccumulated
3	2GEN0001	Defense Education	11	165	165				Unaccumulated
4	2GEN1091	Word & Powerpoint	2	45	15	30			Unaccumulated



No	Code	Name of course	Num of cre	Num of pe d	Allocation				Note
					Theo	Prac/ Lab	Pr oj	T T	
5	3GEN0008	General Laws	2	30	30				
6	2GEN0011	Political Economics of Marxism and Leninism	3	45	45				
7	2SOC11494	Calculus 1	3	45	45				
8	2CTS1408	Introduction to Programming 1	3	60	30	30			
<b>Total accumulated credits of Semester 1</b>			<b>11</b>						
<b>Total credit of Semester 1</b>			<b>29</b>						
<b>Semester 2</b>									
9	2LAN11451	English Skill 2	4	90	30	60			Unaccumulated
10	2GEN0002	Physical Education	1	30		30			Unaccumulated
11	2GEN1093	Excel	2	45	15	30			Unaccumulated
12	2GEN0012	Political Economics of Marxism and Leninism	2	30	30				
13	2SOC1496	Calculus 2	3	45	45				
14	2SOC2485	Discrete Mathematics	3	45	45				
15	CTS2204	Introduction to Information Technology Engineers	2	30	30				
16	2CTS2416	Introduction to Programming 2	3	60	30	30			
<b>Total accumulated credits of Semester 2</b>			<b>13</b>						
<b>Total credit of Semester 2</b>			<b>20</b>						
<b>Semester 3</b>									
17	2LAN11452	English Skill 3	4	90	30	60			Unaccumulated
18	2GEN0002	Physical Education	1	30		30			Unaccumulated
19	2SOC11490	American Culture	3	45	45				
20	2GEN0013	Scientific Socialism	2	30	30				

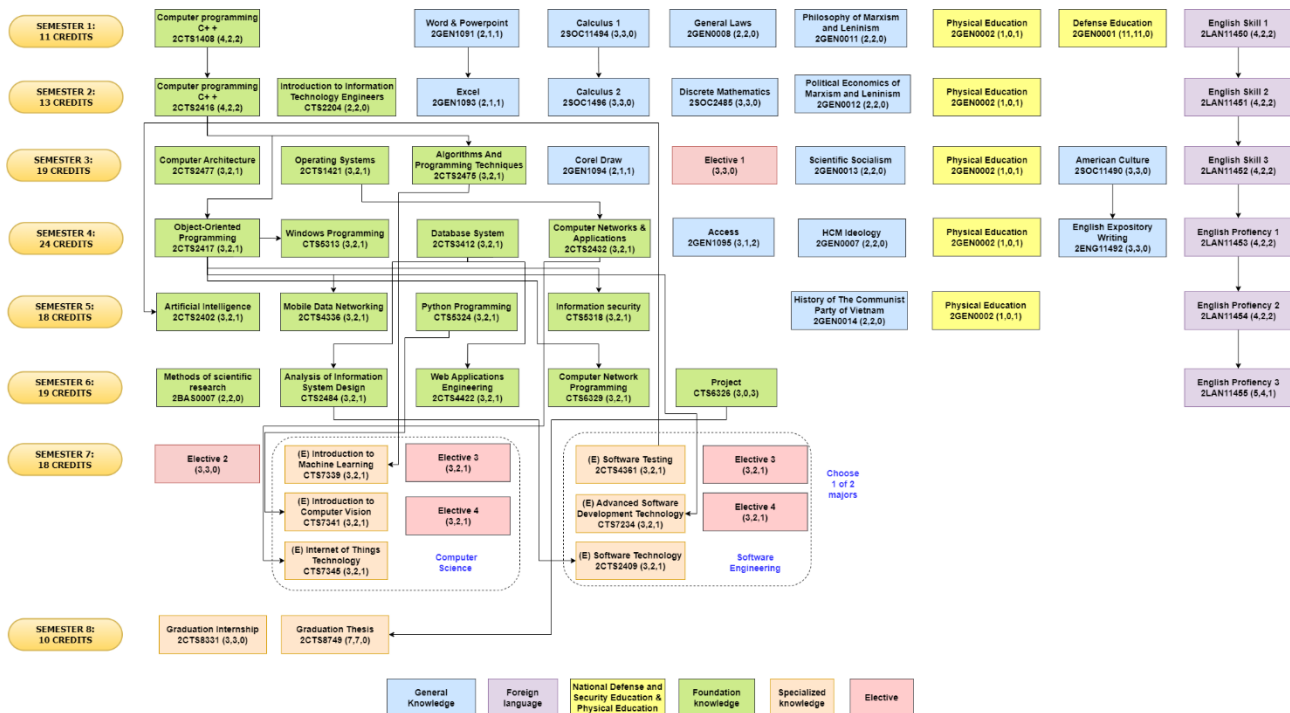
No	Code	Name of course	Num of cre	Num of ped	Allocation				Note
					Theo	Prac/Lab	Proj	TT	
21	2GEN1094	Corel Draw	2	45	15	30			
22	2CTS2477	Computer Architecture	3	60	30	30			
23	2CTS1421	Operating Systems	3	60	30	30			
24	2CTS2475	Algorithms And Programming Techniques	3	60	30	30			
<b>Elective (3 credits)</b>									
25	2BUS11440	Probability & Statistics	3	45	45				
26	2SCE1104	Physics	3	45	45				
27	2SCE1113	Chemistry	3	45	45				
<b>Total accumulated credits of Semester 3</b>			<b>19</b>						
<b>Total credit of Semester 3</b>			<b>24</b>						
<b>Semester 4</b>									
28	2LAN11453	English Proficiency 1	4	90	30	60			
29	2GEN0002	Physical Education	1	30		30			Unaccumulated
30	2GEN0007	HCM Ideology	2	30	30				
31	2ENG11492	English Expository Writing	3	45	45				
32	2GEN1095	Access	3	75	15	60			
33	CTS5313	Windows Programming	3	60	30	30			
34	2CTS2417	Object-Oriented Programming	3	60	30	30			
35	2CTS3412	Database System	3	60	30	30			
36	2CTS2432	Computer Networks & Applications	3	60	30	30			
<b>Total accumulated credits of Semester 4</b>			<b>24</b>						
<b>Total credit of Semester 4</b>			<b>25</b>						
<b>Semester 5</b>									

No	Code	Name of course	Num of cre	Num of pe d	Allocation				Note
					Theo	Prac/ Lab	Pr oj	T T	
37	2LAN11454	English Proficiency 2	4	90	30	60			
38	2GEN0002	Physical Education	1	30		30			Unaccumulated
39	2GEN0014	History of The Communist Party of Vietnam	2	30	30				
40	2CTS2402	Artificial Intelligence	3	60	30	30			
41	CTS5318	Information Security	3	60	30	30			
42	2CTS4336	Mobile Data Networking	3	60	30	30			
43	CTS5324	Python Programming	3	60	30	30			
<b>Total accumulated credits of Semester 5</b>			<b>18</b>						
<b>Total credit of Semester 5</b>			<b>19</b>						
<b>Semester 6</b>									
44	2LAN11455	English Proficiency 3	5	90	60	30			
45	2BAS0007	Methods of scientific research	2	30	30				
46	CTS6326	Project	3	45			45		
47	CTS2484	Analysis of Information System Design	3	60	30	30			
48	2CTS4422	Web Applications Engineering	3	60	30	30			
49	CTS6329	Computer Network Programming	3	60	30	30			
<b>Total accumulated credits of Semester 6</b>			<b>19</b>						
<b>Total credit of Semester 6</b>			<b>19</b>						
<b>Semester 7</b>									
<b>Elective (3 credits)</b>									
50	2ENG11491	English Composition	3	45	45				
51	2ENG11467	Multi Ethnic Literature	3	45	45				
52	2ENG11405	20th Century British Novels	3	45	45				

No	Code	Name of course	Num of cre	Num of pe d	Allocation				Note
					Theo	Prac/ Lab	Pr oj	T T	
<b>Computer Science</b>									
53	CTS7339	Introduction to Machine Learning	3	60	30	30			
54	CTS7341	Introduction to Computer Vision	3	60	30	30			
55	CTS7345	Internet of Things Technology	3	60	30	30			
<b>Elective (choose 2 among 4 courses)</b>									
56	CTS7343	Embedded Systems Design	3	60	30	30			
57	CTS7347	Robotics and Applications	3	60	30	30			
58	CTS7350	Query Multimedia Information	3	45	45				
59	CTS7351	Sound and Voice Processing	3	45	45				
<b>Software Engineering</b>									
60	CTS4361	Software Testing	3	60	30	30			
61	CTS7234	Advanced Software Development Technology	3	60	30	30			
62	2CTS2409	Software Technology	3	45	45				
<b>Elective (choose 2 among 4 courses)</b>									
63	2CTS4332	Introduction To Game Programming	3	60	30	30			
64	2CTS4324	Java Programming	3	60	30	30			
65	CTS4321	Information Technology Project Management	3	45	45				
66	CTS7353	Big Data	3	60	30	30			
<b>Total accumulated credits of Semester 7</b>			<b>18</b>						
<b>Total credit of Semester 7</b>			<b>18</b>						
<b>Semester 8</b>									
67	2CTS8331	Graduation Internship	3						
68	2CTS8749	Graduation Thesis	7						

No	Code	Name of course	Num of cre	Num of ped	Allocation				Note
					Th eo	Prac/ Lab	Pr oj	T T	
Total accumulated credits of Semester 8			10						
Total credit of Semester 8			10						

### 9. Diagram of teaching plan:



### 10. Guidelines to implementation:

- The curriculum is implemented according to the University's Teaching Plan.
- The courses are assigned to lecturers by the corresponding schools/course management units and are taught according to the approved course syllabus.
- The organization of teaching, testing and assessment of courses is implemented in accordance with the Regulation on academic affairs and relevant regulations of the Saigon International University.

### 11. Course description:

#### 11.1. Philosophy of Marxism and Leninism:

This course lays out the basic issues regarding the world view and methodology of Marxism-Leninism conducive to the study and research of other courses within this curriculum as well as knowledge attainment and real-life applications.

### *11.2. Political Economics of Marxism and Leninism:*

This course systematically and selectively provides basic knowledge for Political Economics of Marxism-Leninism, on which students will comprehend the Communist Party's platforms and policies in the context of late-stage society in Vietnam, therefore building and reinforcing trust in the Party and in Socialist Regime of Vietnam.

### *11.3. Scientific Socialism:*

Combined with Marxism-Leninism, Ho Chi Minh Thought, and other relevant subjects, this course provides a comprehensive understanding of Marxism-Leninism, Ho Chi Minh thoughts, and the path to socialism in Vietnam.

### *11.4. HCM Ideology:*

This course provides knowledge on: the origin, formation, and development of Ho Chi Minh thoughts; key Ho Chi Minh thoughts on revolution in Vietnam, on culture, morals, and human development. Students will grasp scientific, revolutionary, and humane values of Ho Chi Minh thoughts and life.

### *11.5. History of The Communist Party of Vietnam:*

This course helps students understand that the Vietnam Communist Party is the pioneering force of the proletariat, their royal representatives, with Marxism-Leninism and Ho Chi Minh Thought as ideological foundation for actions, with continual strive for sovereignty, powerful and prosperous nation, equal, democratic, and civil society with socialist orientation.

### *11.6. Introduction to Information Technology Engineers:*

This course provides students with broad and specialized knowledge pertaining to the curriculum and Information Technology in general. Students will acquire basic skills of: note-taking, communication, conference, presentation, groupwork, etc.; professional presentation; teamwork, including team formation, time management, planning, and problem solving; public speaking, effective communication; scientific and professional ethics appropriate for an engineer-to-be.

### *11.7. General Laws:*

This course provides fundamental knowledge regarding state and laws, including: theoretical frameworks of state and laws (their origin, nature, functions, and key characteristics of the state; origin, forms, concepts, and features of laws); legal system and

relations; legal violations and responsibilities; basic institutions of important laws.

#### *11.8. Calculus 1:*

This course provides basic concepts concerning limit, continuous functions, calculus of univariate functions, series, function series.

#### *11.9. Calculus 2:*

This course provides knowledge on multivariate functions, integral of univariate functions, double integrals, first-order and second-order differential equations, and mathematical applications in economics.

#### *11.10. Discrete Mathematics:*

This course provides knowledge on logic, relations, set theory, counting problem, pigeonhole principle, listing problem, Boolean logic, graph theory and trees.

#### *11.11. Probability & Statistics:*

This course provides basic knowledge on the theories and applications of probability and statistics, including: random events, probability and relevant formulae, random variable and probability distribution, sample theory, variable estimation, hypothesis testing, regression, and linear correlation.

#### *11.12. Physics:*

Students will be equipped with basic physics knowledge and its applications concerning: mechanics, thermology, electric – magnetic field, electromagnetic field, electromagnetic wave, electric – magnetic materials.

#### *11.13. Chemistry:*

Students will be equipped with fundamental knowledge focusing on basic principles of chemistry, of chemical thermodynamics, substance structure, chemical reactions, solution, electrolysis, and colloid.

#### *11.14. English Proficiency 1:*

Upon completion, students will be able to compose simple paragraphs on familiar topics or areas of interest; to describe their experiences, events, dreams, hopes, ambitions; to make simple elaborations for their opinions or plans.

#### *11.15. English Proficiency 2:*

Upon completion, students will be able to comprehend the main ideas of a complex text on specific and abstract issues, including those pertaining to their specialization; to

communicate fluently with native speakers.

*11.16. English Proficiency 3:*

Upon completion, students will be able to compose thorough and detailed text on various topics, to elaborate their position regarding a particular issue, to point out the pros and cons of different options.

*11.17. American Culture:*

This course provides students with knowledge on American geography, economics, politics, and education to be the basis for its multiculturalism, helping them analyze and explain how historical, cultural, economic, and political factors contribute to social phenomena and diversity. The course will employ flipped-classroom and project-based strategies.

*11.18. English Expository Writing:*

Upon completion, students will attain a firm grasp of different types of essay such as: cause-and-effect, compare-and-contrast, narration, description, evaluation, analysis, and argument. They will understand the basic principles of English writing such as cohesion, coherence, and correctness.

*11.19. English Composition:*

This course is designed to help students understand the structure, features, and format of an essay, and how to compose one. Students will learn to organize the crucial components and parts of an essay, recognize and employ appropriate wording, vocabulary, and grammatical structures.

*11.20. Multi Ethnic Literature:*

This course provides students with basic knowledge on American Literature, with special focus on the works of ethnic minority. Students will be able to participate in presentation, literary analysis, discussion, and group work. The course aims to enhance student's English vocabulary and fluency through class activities.

*11.21. 20<sup>th</sup> Century British Novels:*

Students will learn the historical, cultural, and social contexts for each stage of the development of British literature; background and notable works of British authors in the 20th century; literary analysis, appreciation, and inference with respect to social context, literary movements, and author's style.



#### *11.22. Project:*

Undertaking this project, students will get an opportunity to apply what they have learned to practice, forming the foundation for further research and graduation thesis.

#### *11.23. Graduation Internship:*

Students will get the opportunity to experience and learn more about the IT working environment in practice in preparation for their postgraduation career.

#### *11.24. Graduation Thesis:*

Graduation Thesis helps students improve their skills and apply what they have learned to build an application or conduct an intensive research into computer science.

#### *11.25. English Skill 1:*

Upon completion, students will understand and get fluent in everyday English structures; vocabulary for basic conversation; self-introduction and introduction of others; response to basic questions concerning home, family, friend, etc. Students will be capable of basic conversation with clear articulation and support from the other speaker.

#### *11.26. English Skill 2:*

Upon completion, students will be able to grasp the structures frequently used in basic conversations (concerning family, self, purchase, direction, job, etc.) and handle simple, familiar dialogues on self, environment, and basic needs.

#### *11.27. English Skill 3:*

Upon completion, students will be able to grasp the gist of a formal speech on familiar topics concerning school, work, entertainment, etc., and to handle situations encountered in English-speaking areas.

#### *11.28. Physical Education:*

Students will be equipped with knowledge on Physical Education and trained on exercises, track and field (middle distance), keeping fit, therefore understanding PE's significance.

#### *11.29. Defense Education:*

Students will gain a basic understanding of Communist Party's military policies, the practice of national defense and security, general military training and organization.

#### *11.30. Methods of Scientific Research:*

Students will be equipped with fundamental knowledge on research methodology,

research methods, and the proper steps to conduct research. They will understand the significance of scientific research in professional development and get familiarized with the research process in practice.

#### *11.31. Introduction to Programming 1:*

This course serves as an introduction to programming through C programming language, laying the foundation for other specialized subjects in this curriculum. A firm grasp of this course is crucial for development of reasoning and programming skills necessary in problem solving in theory as well as in practice.

#### *11.32. Operating Systems:*

This course provides basic knowledge on the mechanism of operating systems and discusses issues concerning the functions of such systems: process management, memory management, folder and file management, peripheral management, etc.

#### *11.33. Artificial Intelligence:*

This course provides a basic understanding of artificial intelligence. The main focus will be on problem solving approaches and their applications, with an emphasis on the heuristic approach. Methods of knowledge representation and processing will also be instructed. Students will be introduced to approximate reasoning, machine learning, description logic, and search strategy using Minimax and  $\alpha$ - $\beta$  pruning, along with new research approaches. Students will be familiarized with problems of optimizing search strategies and representing knowledge using basic methods.

#### *11.34. Introduction to Programming 2:*

This course helps enhance students' programming skills pertaining to array, data cursor, recursion, file reading and recording, multicomponent data for structured computing problems.

#### *11.35. Object-Oriented Programming:*

This course helps students approach object-oriented programming, learning how to analyze, design, and execute a program via such approach. They will be introduced to Unified Modeling Language (UML) and Java programming language.

### *11.36. Computer Networks & Applications:*

This course ensures students will firmly grasp how to build a computer network to organize an information system, program network interaction, or build a secured information network.

### *11.37. Algorithms and Programming Techniques:*

This course helps students understand the importance of algorithm and data organization, the two essential features of any program. Students will be provided with organizing methods and basic operations with data structures, thus developing the right algorithms appropriate for specific types of computer programs. The tool to be used in this course is C programming language.

### *11.38. Computer Architecture:*

This course focuses on the analysis and organization of a computer system, which includes: digital circuitry in computer design, ALU, CPU, communication among CPU, memory, and peripheral; architecture of personal computer (PC); programming concepts pertaining to micro-processing.

### *11.39. Database System:*

This course provides basic concepts concerning databases, data independence, database architecture, from which students can organize physical data, optimize the problems encountered, ensure data security and integrity, evaluate databases, and learn their utilities: algebraic language, structured query language (SQL), data constraints and optimization.

### *11.40. Mobile Data Networking:*

This course provides students with a fundamental understanding of application design and development for mobile devices, including general concepts and knowledge, app interface design, relevant tools, event processing, toolkits, application development, testing, and deployment. Students will learn Native application development on Android platform, component programming for Android apps such as: Activity, Service, Content provider, Broadcast receiver, Intent.

### *11.41. Web Applications Engineering:*

This course is designed with fundamental knowledge on web programming, relevant programming methods, basic and advanced development of web applications via asp.net with mobile device compatibility.

#### *11.42. Word & Powerpoint:*

In Microsoft Word, students will get familiarized with the basic and advanced tools of Microsoft Word for work, study, and the MOS-Word exam. In Microsoft PowerPoint, students will learn the basic and advanced tools of Microsoft PowerPoint for work, study, and the MOS-PowerPoint exam.

#### *11.43. Excel:*

Students will learn the basic and advanced tools of Microsoft Excel for work, study, and the MOS-Excel exam.

#### *11.44. Corel Draw:*

Students will be equipped with basic knowledge on graphic designing on computer. They will learn in details how to use CorelDRAW X8 to create an advertisement, a logo, a graphic design, how to properly organize a poster.

#### *11.45. Access:*

Students will get familiarized with the basic and advanced tools of Microsoft Access for work and study, such as basic query, fundamental analytics, functions of SQL, etc.

#### *11.46. Analysis of Information System Design:*

Students will employ what they have learned to analyze and design a solution to a real-life problem; to build integrated object model and process model, specifically data-flow diagram; set up a database management system using specific programming language based on the integrated object model.

#### *11.47. Windows Programming:*

This course provides general information on .Net Framework; basic concepts regarding graphic programming, event programming; practice pertaining to app programming in C# language and connecting a database with Windows Form via ADO.NET.

#### *11.48. Information Security:*

This course provides fundamental knowledge on information protection in general (common models, data security mechanisms, cryptography, etc.).

#### *11.49. Python Programming:*

This course provides students with basic to advanced knowledge on Python programming.

#### *11.50. Computer Network Programming:*

This course provides basic knowledge and skills for network application programming, including relevant fundamental concepts, input/output flow management programming, database connection management, multiprocess programming, address management, TCP Socket, UDP Socket, app design, Multicast, RMI, etc.

#### *11.51. Introduction to Machine Learning:*

After an introduction to machine learning and design schemata, students will learn key concepts pertaining to machine learning methods. In addition to basic algorithms, this course also focuses on learning system design, learning system quality assessment, news on machine learning. Upon attaining specific techniques and algorithms, students will learn how to utilize them, to research specialized topic, and other practical implications.

#### *11.52. Introduction to Computer Vision:*

This course focuses on key topics such as computer vision, visual information query for images and video images at content and semantic levels. Upon completion, students will be able to write computer vision applications and retrieve visual information including digital images and videos, as well as biometric features.

#### *11.53. Embedded Systems Design:*

This course provides knowledge on general concepts of embedded system models, embedded applications, embedded system design, embedded software programming tools and principles, as well as different embedded systems categorized by microprocessor generations.

#### *11.54. Internet of Things Technology:*

Students will be equipped with basic knowledge on Internet of Things (IoTs) technology including relevant concepts and issues, as well as IoTs applications.

#### *11.55. Robotics and Applications:*

This course provides basic knowledge on robot and relevant methods for computing, simulating, pathway design, and robot control.

#### *11.56. Query Multimedia Information:*

This course provides fundamental knowledge on how to build an information query system, especially textual information. Students will learn: general structure of an information query system; pre-processing and document indexing; important information query models

such as vector space model, probability model, language model; practical evaluation of an information system query, query feedback and expansion, web search engine operations.

*11.57. Sound and Voice Processing:*

This course introduces multimedia technologies and relevant research approaches. Students will be introduced to the concepts, roles, and applications of such technologies, as well as audio and audio processing tools, image and video processing tools. To attend this course, basic knowledge on data encryption, image processing, and fluency in one programming language are required.

*11.58. Advanced Software Development Technology:*

This course provides basic and specialized knowledge on important topics in software engineering; methods, techniques, and tools used to enhance the effectiveness of software development.

*11.59. Big Data:*

This course provides students with proper knowledge and techniques of data mining for attainment of useful insights. The significance of mined insight with respect to decision and policy making will be discussed along with practical implications.

*11.60. Software Testing:*

This course provides students with knowledge on software testing, relevant processes, and simple techniques in designing and setting up a test. Students will gain the ability to design, test, and evaluate a specific software in practice. They will also get familiarized with some error management tools and automated testing tools.

*11.61. Java Programming:*

This course provides students with basic concepts and statements concerning Java programming, methods of developing data structures in Java, built-in data structures and their applications. Students will be introduced to Java programming, as well as desktop and Internet application development using Java.

*11.62. Information Technology Project Management:*

This course focuses on information technology management issues such as project planning and supervision. Students will also understand the significance of planning and the roles of different participants.

*11.63. Software Technology:*

This course provides an understanding of software engineering processes and basic methods of software development. Students will learn about the specific criteria for each of the software development stages.

*11.64. Introduction to Game Programming:*

This course presents basic issues concerning game softwares, including game development, basic game components, design models, artificial intelligence building. Students will be introduced to various object-oriented tools and environments to develop a simple game.

*Note: Please attach the outlines of all courses listed in this curriculum.*

**CHANCELLOR**

**DEAN**