

**Phụ lục 2: CHƯƠNG TRÌNH ĐÀO TẠO NGÀNH CÔNG NGHỆ THÔNG TIN**  
**(Áp dụng từ khóa số 1)**  
*(Ban hành theo Quyết định số 205/QĐ-ĐH FPT ngày 08 tháng 05 năm 2020)*

HK0		HK1		HK2		HK3		HK4		
1	Định hướng và Rèn luyện tập trung	Nhập môn khoa học máy tính	3	Trí tuệ nhân tạo [MOOC]	3	TTNT và KHDL với Python và SQL [m]	3	Học máy [m]	3	
2	Giáo dục thể chất 1	2	Toán cho ngành kỹ thuật	3	Toán rời rạc	3	Toán cho học máy	3	Thị giác máy tính	3
3	Tiếng Anh chuẩn bị		Tổ chức và Kiến trúc máy tính	3	Cấu trúc dữ liệu và giải thuật với Python	3	Xác suất thống kê	3	Dự án TTNT-KHDL [m]	3
4	Nhạc cụ truyền thống	3	Cơ sở lập trình với Python	3	Các hệ cơ sở dữ liệu	3	Đạo đức trong CNTT [MOOC]	3	Nhập môn kỹ thuật phần mềm [MOOC]	3
5			Kỹ năng học tập đại học [MOOC]	3	Kỹ năng giao tiếp và cộng tác	3	Ngoại ngữ 2 (1) - Tiếng Nhật sơ cấp 1-A1.1	3	Ngoại ngữ 2 (2) - Tiếng Nhật sơ cấp 1-A1.2	3
6			Giáo dục thể chất 2	2	Giáo dục thể chất 3	2				
		5	17		17		15		15	

**Note:**

**AI\_COM\*Y: Môn thứ Y của Combo thứ \* chuyên ngành AI.**

**\* = {1, 2, 3}**

**Y = {1, 2, 3, 4}**

**TIN CHUYÊN NGÀNH TRÍ TUỆ NHÂN TẠO PHÂN BỐ THEO HỌC KỲ**  
**inh viên 16D & 17A)**

*háng 03 năm 2022 của Hiệu trưởng Trường Đại học FPT)*

<b>HK5</b>		<b>HK6</b>		<b>HK7</b>		<b>HK8</b>		<b>HK9</b>	
Học sâu [m]	6	Đào tạo trong môi trường thực tế	10	Phát triển UDTTNT với TensorFlow [m]	3	AI17_COM*4 [m]	3	Đồ án tốt nghiệp TTNT	10
		Trải nghiệm khởi nghiệp 1	3	Trải nghiệm khởi nghiệp 2	3	Học tăng cường	3	Chủ nghĩa xã hội khoa học	2
Phát triển web với Python [MOOC]	3			Xử lý ngôn ngữ tự nhiên [MOOC]	3	Thiết kế sản phẩm TTNT [MOOC]	3	Tư tưởng HCM	2
AI17_COM*1 [m]	3			Kỹ năng viết học thuật [MOOC]	3	Quản trị dự án [MOOC]	3	Lịch sử Đảng Cộng sản VN	2
AI17_COM*2 [m/MOOC]	3			AI17_COM*3 [m]	3	Triết học Mác-Lênin	3		
						Kinh tế chính trị Mác-Lênin	2		
15		13		15		17		16	

**Phụ lục 2:**

**MÔ TẢ CÁC HỌC PHẦN CHUYÊN NGÀNH 1**  
**(Áp dụng từ khóa sinh v**  
*(Ban hành theo Quyết định số 205/QĐ-ĐHFPT ngày 08 tháng*

STT	Mã	Tên học phần (Tiếng Việt)	Tên học phần (Tiếng Anh)	Số tín chỉ
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1	OTP101	Định hướng và Rèn luyện tập trung	Orientaiton and General Training Program	0
2	ENT001	Tiếng Anh 1	English 1 (Topnotch Fundamental)	0

3	ENT104	Tiếng Anh 2	English 2 (Top Notch 1)	0
4	ENT203	Tiếng Anh 3	English 3 (Top Notch 2)	0
5	ENT303	Tiếng Anh 4	English 4 (Top Notch 3)	0
6	ENT403	Tiếng Anh 5	English 5 (Summit 1)	0
7	ENT503	Tiếng Anh 6	English 6 (Summit 2)	0
8	LUK1	Little UK level 1	Little UK level 1	0

9	LUK2	Little UK level 2	Little UK level 2	0
10	LUK3	Little UK level 3	Little UK level 3	0
11	LUK4	Little UK level 4	Little UK level 4	0

12	TRS401	Tiếng Anh 4	English 4 (University success)	0
13	TRS403	Tiếng Anh 4	English 4 (Speak Your Mind level 3)	0
14	LUK5	Little UK level 5	Little UK level 5	0
15	TRS501	Tiếng Anh 5	English 5 (University success)	0
16	LUK6	Little UK level 6	Little UK level 6	0

17	TRS601	Tiếng Anh 6	English 6 (University success)	0
18	VOV114	Vovinam 1	Vovinam 1	2
19	VOV124	Vovinam 2	Vovinam 2	2
20	VOV134	Vovinam 3	Vovinam 3	2
21	COV111	Cờ Vua 1	Chess 1	2
22	COV121	Cờ Vua 2	Chess 2	2
23	COV131	Cờ Vua 3	Chess 3	2



24	MLN111	Triết học Mác-Lênin	Philosophy of Marxism – Leninism	3
25	MLN122	Kinh tế chính trị Mác-Lênin	Political economics of Marxism – Leninism	2
26	MLN131	Chủ nghĩa xã hội khoa học	Scientific socialism	2
27	HCM202	Tư tưởng HCM	HCM Ideology	2

28	VNR202	Lịch sử Đảng Cộng sản Việt Nam	History of Việt Nam Communist Party	2
29	EXE101	Trải nghiệm khởi nghiệp 1	Experiential Entrepreneurship 1	3
30	EXE201	Trải nghiệm khởi nghiệp 2	Experiential Entrepreneurship 2	3
31	SSL101c	Kỹ năng học tập đại học	Academic Skills for University Success	3
32	SSG104	Kỹ năng giao tiếp và cộng tác	Communication and In-Group Working Skills	3

33	ENW492c	Kỹ năng viết học thuật	Academic Writing Skills	3
34	JPD113	Ngoại ngữ 2: Tiếng Nhật sơ cấp 1-A1.1	2nd Foreign Language: Elementary Japanese 1-A1.1	3
35	JPD123	Ngoại ngữ 2: Tiếng Nhật sơ cấp 1-A1.2	2nd Foreign Language: Elementary Japanese 1-A1.2	3
36	ĐTR102	Nhạc cụ truyền thống-Đàn Tranh	Traditional musical instrument_Đàn Tranh	3

37	ĐBA102	Nhạc cụ truyền thống-Đàn Bầu	Traditional musical instrument_Đàn Bầu	3
38	ĐNG102	Nhạc cụ truyền thống-Đàn nguyệt	Traditional musical instrument_Đàn nguyệt	3
39	ĐNH102	Nhạc cụ truyền thống- Đàn Nhị	Traditional musical instrument_Đàn Nhị	3
40	ĐSA102	Nhạc cụ truyền thống- Sáo trúc	Traditional musical instrument_Sáo trúc	3

41	ĐTB102	Nhạc cụ truyền thống-Đàn Tỳ bà	Traditional musical instrument_ Đàn Tỳ bà	3
42	TRG102	Nhạc cụ truyền thống- Trống dân tộc	Traditional musical instrument_ Trống dân tộc	3
43	MAE101	Toán cho ngành kỹ thuật	Mathematics for Engineering	3

44	MAD101	Toán rời rạc	Discrete mathematics	3
45	MAS291	Xác suất thống kê	Statistics & Probability	3

46	CSII05	Nhập môn khoa học máy tính	Introduction to Computer Science	3
47	CEA201	Tổ chức và Kiến trúc máy tính	Computer Organization and Architecture	3
48	PFP191	Cơ sở lập trình với Python	Programming Fundamentals with Python	3
49	CSD203	Cấu trúc dữ liệu và giải thuật với Python	Data Structures and Algorithm with Python	3

50	DBI202	Các hệ cơ sở dữ liệu	Database Systems	3
51	SWE201c	Nhập môn Kỹ thuật phần mềm	Introduction to Software Engineering	3
52	PMG202c	Quản trị dự án	Project management	3
53	ITE303c	Đạo đức trong CNTT	Ethics in IT	3
54	OJT202	Đào tạo trong môi trường thực tế	On-The-Job-Training	10



55	AIG201c	Trí tuệ nhân tạo	Artificial Intelligence	3
56	MAI391	Toán cho học máy	Mathematics for Machine Learning	3
57	AIL303m	Học máy	Machine Learning	3
58	DPL302m	Học sâu	Deep Learning	6

59	REL301	Học tăng cường	Reinforcement Learning	3
60	ADY201m	TTNT và KHDL với Python và SQL	AI, DS with Python & SQL	3
61	AID301c	Thiết kế sản phẩm TTNT	AI in Production	3
62	DAP391m	Dự án TTNT-KHDL	AI-DS Project	3
63	DWP301c	Phát triển web với Python	Web Development with Python	3

64	DAT301m	Phát triển UDDTNT với TensorFlow	AI Development with TensorFlow	3
65	CPV301	Thị giác máy tính	Computer Vision	3
66	NLP301c	Xử lý ngôn ngữ tự nhiên	Natural Language Processing	3
67	AIP490	Đồ án tốt nghiệp TTNT	AI Capstone Project	10

68	DSR301m	Khoa học dữ liệu (KHDL) ứng dụng với R	Applied DS with R	3
69	BDI301c	Dữ liệu lớn	Big Data	3
70	DBM302m	Khai phá dữ liệu	Data Mining	3
71	DSP391m	Dự án KHDL	Data Science - Capstone Project	3
72	SEG301m	Công cụ tìm kiếm	Search Engines	3

73	TMG301m	Khai thác văn bản	Text Mining	3
74	SLP301m	Xử lý tiếng nói	Speech Processing	3
75	IMP302m	Xử lý hình ảnh và video	Image & Video processing	3
76	AIB301c	Ứng dụng TTNT cho thương mại	AI for Business	3
77	AIH301m	Ứng dụng TTNT trong chăm sóc sức khỏe	AI in Healthcare	3
78	AIM301m	Ứng dụng TTNT cho y học	AI for Medicine	3

79	AID301m	Ứng dụng TTNT cho giao dịch	AI for Trading	3

**a**

**TRÍ TUỆ NHÂN TẠO, NGÀNH CNTT**

**đơn 16Đ & 17A)**

*03 năm 2022 của Hiệu trưởng Trường Đại học FPT)*

<b>Mô tả học phần</b>
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~~training regulations, how to use information systems to serve students' learning.~~

- Share study skills for university students
- Share with students on topics related to awareness, activities for the sake of community

\* Module 2: Military training

Follow the program promulgated by the Ministry of Education and Training.

\* Module 3: Experience

This module mainly includes:

- Organize reading, analysis and review of memoirs
- Organize specialized talks
- Organizing experiential activities for students (Towards sustainable development and volunteering for the community)

\* Module 4: Vovinam

Follow the syllabus of VOV114.

Objectives of the Orientation and General Training Program:

- 1) Guide students to complete the procedures before enrolling in official training.
- 2) Provide students with knowledge about FPT Corporation, FPT University as well as functional departments of FPT University that will support students during their study at the university.
- 3) Introduce the training programs, models and training regulations of FPT University, sharing study skills for university students and the information systems to help students quickly adapt to the new learning environment.
- 4) Provide students with basic knowledge and skills on defense and security education, building and deepening patriotism and national pride through history lessons, specialized talks, documentaries, the military base visits and memoirs about the two long-term resistance wars of the Vietnamese nation.
- 5) Help students improve the will, the physical strength, and sense of responsibility through physical education lessons and practice in the training ground.
- 6) Help students develop teamwork, discipline, proper attitude and behavior towards friends, lecturers and in the educational environment.
- 7) Enhance student experiences with extra-curricular activities. Improve the community spirit for students through volunteering activities, community activities, and activities towards sustainable development.

This course is designed to further develop the learner's confidence and fluency in using the English language and to enrich their learning experience through interactive lessons and communicative exercises. It is to help students acquire the vocabulary range and to enhance all language skills required for the fundamentals level. Additional writing and grammar lessons will be incorporated in the course.



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This course is designed to further develop the learner's confidence and fluency in using the English language and to enrich their learning experience through interactive lessons and communicative exercises. It is to help students attain competence in all skills of the English language, especially reading skills.

This course aims to provide students with:

#### I. PROFESSIONAL ENGLISH

##### 1. Communication 1

- Basic conversations 1
- Phonics 1

##### 2. Social skills

- Confidence
- Good learning habits

#### II. 21st CENTURY SKILLS

Networking 101

This course aims to provide students with:

I. PROFESSIONAL ENGLISH

1. Communication 2

- Advanced conversation
- Phonics 2

2. Discussion

- Listening & note-taking 1
- Short article reading (600L)

II. 21st CENTURY SKILLS

1. Presentation intro

2. Teamwork 1

This course aims to provide students with:

I. PROFESSIONAL ENGLISH

1. Communication 3

- Discussion on global issues
- Phonics in use

2. Presentation

- Listening & note-taking 2
- Reading articles (1200L)
- Projects

II. 21st CENTURY SKILLS

1. Teamwork 2

2. Problem solving 1

This course aims to provide students with:

I. PROFESSIONAL ENGLISH

1. Communication 4

- Academic discussion
- Presentation 2

2. Debate 1

- Reading book chapters
- Research, note-taking 3
- Writing arguments 1

II. 21st CENTURY SKILLS

1. Critical thinking 1

2. Problem solving 2

3. Teamwork 3

This course is to help students attain competence in Speaking and Listening skills of the English language in academic environment and to prepare students to understand and process lengthy academic lectures, defend their ideas, speak thoughtfully in discussions, and contribute to group projects.

This project-based course equips students with language and soft skills including team-work and problem solving skills to be able to use English quite independently in common daily interactions and some limited academic situations.

This course aims to provide students with:

I. PROFESSIONAL ENGLISH

1. Debate 2

- Academic reading & research
- Writing speeches

2. Academic courses

- Academic lectures
- Projects

II. 21st CENTURY SKILLS

1. Critical thinking 2

2. Problem solving 3

3. Leadership 1

This course is to help students attain competence in all skills of the English language, especially reading skills and writing skills. This course is designed to further develop the learner's confidence and fluency in using the English language and to enrich their learning experience through interactive lessons and communicative exercises.

This course aims to provide students with:

I. PROFESSIONAL ENGLISH

1. Debate 3.

- Academic reading & research
- Writing speeches & articles

2. Academic courses

- Academic lectures
- Essays & Projects

II. 21st CENTURY SKILLS

1. Critical thinking

2. Problem solving

3. Leadership

<p>This course is to help students attain competence in all skills of the English language, especially reading skills and writing skills. This course is designed to further develop the learner's confidence and fluency in using the English language and to enrich their learning experience through interactive lessons and communicative exercises.</p>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>- Stances: Middle stance, bow stance, horse stance, front stance, triangle stance.</li> <li>- Hand techniques: <ul style="list-style-type: none"> <li>* 4 cutting edge techniques;</li> <li>* 7 punch techniques;</li> <li>* 4 hand parry techniques;</li> <li>* 4 elbow techniques;</li> </ul> </li> <li>- Leg techniques: Straight kick; crescent kick; roundhouse kick; side kick;</li> <li>- Counter attack techniques: counter attack straight right punch; counter attack long right punch; counter attack right uppercut punch.</li> <li>- Physical strength.</li> </ul>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>* Attacking combos: From 1 - 10</li> <li>* Kata lessons: Nhap Mon Form</li> <li>* Physical strength</li> </ul>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>- Self-defense techniques: Front hair grab 1; Two hands grab two front wrists technique.</li> <li>- Creative self-defense techniques.</li> <li>- Build multi-activity performances at the end of the course.</li> </ul>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>- Focus on: basic knowledge of Chess.</li> <li>- Focus on: basic techniques; competition-style practice.</li> </ul>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>- Focus on: Rules of chess; Stages of a chess match; Strategy and tactics; Combination in chess.</li> </ul>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>- Focus on: Exercises on strategy and tactics; Exercise on Opening stage; Exercise on combination by topic.</li> </ul>

Philosophy of Marxism – Leninism studies dialectical materialistic views on nature, society, and the mind, making the worldview of dialectical materialism becomes comprehensive. Applying and expanding the dialectical materialist perspective to social research, Marx has introduced historical materialism and pointed out the way to study the laws of social development and natural development governed by objective laws rather than subjective factors. The development of Marxism – Leninism philosophy has laid the foundation for the study of history and social life in a scientific way.

Political economics of Marxism – Leninism is an economic theory and scientific discipline on political economy developed by C. Marx, Engels and later Lenin in a new period, focusing on the capitalist mode of production and the production and economic exchange relations consistent with the capitalist mode of production, thereby clarifying the nature and phenomena of economic processes, laying a foundation to solve matters related to theories of Marxism - Leninism. The core of the Marxist-Leninist political economy is the surplus value theory of Marx.

Scientific socialism is one of the three parts of Marxism-Leninism. Scientific socialism is based on the philosophical methodology of dialectical materialism and historical materialism as well as scientific theoretical foundations of economic laws and economic relations to scientifically explain the advent of scientific socialism socialist revolution, the formation and development of the communist socio-economic form, associated with the historical mission of the working class, to liberate people and society.

Ho Chi Minh ideology is the crystallization of the thousand-year-old traditions of national construction and defense of the Vietnamese people. On that basis, Ho Chi Minh ideology has collected intellectual values of absorbing Eastern, Western, creatively applied and developed Marxism-Leninism to Vietnamese practices. From a philosophical perspective, Ho Chi Minh's thought is a comprehensive and profound system of views on fundamental issues of the Vietnamese revolution. Its goal is aiming at class liberation, national liberation and human liberation. Therefore, Ho Chi Minh ideology has become precious spiritual asset and a torch leading the Vietnamese revolution to gain one victory to another.

<p>History of CPV is a major and a division of historical science. President Ho Chi Minh affirmed that the history of the Communist Party of Vietnam is golden pages. That is scientific, revolutionary and profound practical value in the Party's platforms and guidelines, is proper leadership and timely response to requirements and missions set by the history; is the normative and theoretical experiences and lessons of Vietnamese revolution and the glorious traditions of the Party.</p> <p>Researching and studying history of CPV not only requires mastering historical events and milestones but also understanding those issues in the process of leading and struggling; thereby applying and developing in the current period of comprehensive renovation and accelerating industrialization and modernization and international integration.</p>
<p>The subject provides students with the basic theories and tips needed to start a business effectively. The course will cover the most important aspects of modern entrepreneurship. Students will be able to interact with lecturers and businessmen and listen to their extensive experience and unique perspective on the entrepreneurial world of startups. Students will form groups to develop startup ideas together and perform this project with guidance and support from instructors and mentors throughout the course.</p>
<p>In this course, students will develop products for their start-up ideas prepared in Experiential Entrepreneurship 1, deploy a sales process and find real customers for the group's products/services. Students can get useful tips and experiences for realizing their startup projects through lectures/talks. In addition, seminars and workshops covering related topics will be planned and implemented each term according to actual needs and situations.</p>
<p>This course is designed to raise students' awareness of academic preparation for their years at university. Students will be equipped with the core values and expectations of the academic culture, practical strategies to apply to their learning such as skills to use digital platforms for learning, problem-solving, critical thinking, and communication skills.</p>
<p>The course aims to equip students with scientific awareness of communication, communication skills, teamwork and collaboration skills; building a positive and proactive attitude of communication, collaboration and working in groups for students. On that basis, students will have the ability to communicate, collaborate, and work effectively in groups when studying and working.</p>

This course equips students with essential tools for effective and normative academic writing. Students will learn to express their ideas clearly through writing skills and be able to practice all the skills learned in this course through the final project.

Provides students with the most basic knowledge of Japanese: phonetics, writing, simple sentences for communication and basic knowledge of listening and speaking skills. The course will cover:

- 1) Introduction to Japanese: letters, basic greetings,...
- 2) Main Lessons (Lessons 1 to 3) (Dekiru Nihongo - Beginner Textbook)
- 3) Advanced lessons:
  - Practice listening and speaking skills
  - Practice doing tests in the format of JLPT (N5)

Improve and broaden students' basic knowledge of Japanese phonetics, writing, grammar, sentence patterns for communication, listening comprehension and speaking skills.

The course will cover:

- 1) Main Lessons (Lessons 4 to 7) (Dekiru Nihongo - Beginner Textbook)
- 2) Advanced lessons:
  - Practice listening and speaking skills
  - Practice doing tests in the format of JLPT (N5)

In this course, students will learn:

- Historical development of Dan Tranh in Vietnam and some countries (China, Korea, Japan)
- Structure and characteristics of Dan Tranh
- The playing posture
- Music theory and basic techniques, including:
  - + System of letters in music
  - + Use right fingers to pluck the strings
  - + Left-hand technique of vibration
  - + Combine plucking strings and vibration technique
- Practice: playing Vietnamese songs: Vào rừng hoa, Xăng xê, Mã vũ, Lý cây đa
- Foreign songs: Auld lang syne (Scottish folk song, or Variation on the French folk theme by Mozart.)

<p>In the course, students will learn:</p> <ul style="list-style-type: none"> <li>- Historical development of Dan Bau in Vietnam</li> <li>- Structure and characteristics of Dan Bau</li> <li>- Postures when playing Dan Bau</li> <li>- Music theory and basic techniques, including: <ul style="list-style-type: none"> <li>+ Plucking strings</li> <li>+ Raise or lower the pitch to play the major second interval</li> </ul> </li> <li>- Practice playing Vietnamese songs: Co la, ly cay da (ensemble performance)</li> </ul> <p>Foreign songs: Auld lang syne (Scottish folk song)</p>
<p>In the course, students will learn:</p> <ul style="list-style-type: none"> <li>- Historical development of Dan Nguyet in Vietnam</li> <li>- Structure and characteristics of Dan Nguyet</li> <li>- The playing posture</li> <li>- Music theory and basic techniques, including <ul style="list-style-type: none"> <li>+ Right hand plucking</li> <li>+ Press with 3 fingers</li> <li>+ Combine plucking and pressing together</li> </ul> </li> <li>- Practice playing: Xang xe, ma vu, ly cay bong</li> </ul> <p>Foreign songs: Auld lang syne - Scottish folk song, or Variation on the French folk theme by Mozart.</p>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>- Historical development of Dan Nhi in Vietnam and some countries (China, Korea, Japan)</li> <li>- Structure and characteristics of Dan Nhi</li> <li>- The playing posture</li> <li>- Music theory and basic techniques, including: Pluck strings by right-hand and pes strings with fingers 1,2,3</li> </ul> <p>Be able to play 4 Vietnamese songs: Inh la oi, Vao rung hoa, Ly cay da and Xang xe</p> <p>Be able to play 1 foreign song: "Khat vong mua xuan" or Happy birthday</p>
<p>In this course, students will learn:</p> <ul style="list-style-type: none"> <li>- Historical development of Sao truc in Vietnam</li> <li>- Structure and characteristics of Sao truc</li> <li>- The playing posture, single tongue technique, T'ri technique</li> <li>- Practice playing Vietnamse songs: Xang xe, Co la or Ly cay da</li> <li>- Foreign song: Happy birthday, or Jumeo and Julies.</li> </ul>



In this course, students will learn:

- Historical development of Dan Ty ba in Vietnam
- Structure and characteristics of Dan Ty ba
- The playing posture
- Music theory and basic techniques, including
  - + Pluck with right-hand and press with left-hand to create high-pitched sounds
- Practice playing Vietnamese songs: Con chim ri, Vao rung hoa, Vietnamese folk song (Co la or ly cay da), ancient song (Xang xe, Ma vu)
- Foreign song: Auld lang syne Scottish folk song or "Bóng ai qua thềm"

In the course, students will learn:

- Historical development of traditional drum in Vietnam
- Structure and characteristics of traditional drum
- The playing posture
- Music theory and basic techniques, including
  - + Practice producing sounds
  - + Right-hand and left-hand techniques
  - + Learn rhythm patterns - 2/4 and 4/4 time signatures - drumming styles
- Practice drum accompaniment to Vietnamese folk song: Ly cay da
- Traditional music: Xang xe, Ma vu

This course provides the basics of calculus and linear algebra and their applications in science and engineering. Topics include:

- Analysis: Functions and limits of functions, derivatives, applications of differentials, integrals, series, etc.
- Linear algebra: System of linear equations, matrix algebra, determinant of matrices, matrix diagonalization, vector space, etc.

Upon finishing the course, students must acquire:

1. the following knowledge: (ABET a.1)

- Concepts of logical expressions & predicate logic.
- The method of induction and recursive definition.
- Concepts of algorithms, recursive algorithms, the complexity.
- Recurrence relations and divide-and-conquer algorithms.
- Application of integers and congruence in information technology.
- Set structure and map, counting principles and combinatorics concepts.
- The terminologies and properties of graphs & trees & weighted graphs.
- The applications of graphs, trees and weighted graphs in information technology.

2. the following skills: (ABET a.2)

- Manipulate logical expressions & produce equivalent logical expressions.
- Produce proof of simple mathematical propositions, including applying induction method.
- Evaluate complexity of algorithms.
- Solving simple congruence equations.
- Apply counting techniques in evaluating various set cardinalities.
- Solve counting problems, apply in analyze algorithms.
- Apply graph's algorithms to solve problems related to graph theory.

Upon finishing the course, students must acquire:

1. the following knowledge:(ABET a1)

- The fundamental principles of probability and their applications
- The frequently used probability distributions.
- The basics of descriptive statistics
- The inferences of statistics: parameter estimations, hypothesis testing, regressions & correlations.

2. the following skills: (ABET a2)

- Recognize simple statistical models and applied them to solve engineering problems.
- Use at least one statistical software (Excel, Maxima) for problem solving.
- Self-study skill. (ABET i)

This course provides an overview of the fundamentals of computer science and Artificial Intelligence (AI). In the first part, students will learn about all areas of computer science such as computer organization, networks, operating systems, data structures, file structures, social and professional ethics issues. In the second part, students will learn about the concept of AI, exploring the use and applications of AI. Students will be exposed to various issues related to AI such as scientific ethics, biases, employment and receive advice from experts on learning and starting a career in AI.

This course is an introduction to computer architecture and organization. It will cover topics in both the physical design of the computer (organization) and the logical design of the computer (architecture). The main contents include the organization of a simple stored-program computer: CPU, busses and memory; Instruction sets, machine code, and assembly language; Conventions for assembly language generated by compilers; Floating-point number representation; Hardware organization of simple processors; Address translation and virtual memory; Very introductory examples of input/output devices, interrupt handling and multi-tasking systems.

Module covered: Computer Evolution and Performance; A Top-Level View of Computer Function and Interconnection; Cache Memory; Internal Memory; External Memory; Input/Output; Operating System Support; Instruction Sets: Characteristics and Functions; Processor Structure and Function; Reduced Instruction Set Computers; Instruction-Level Parallelism and Superscalar Processors; Parallel Processing; Multicore Computers.

The course provides an introduction to Python (programming language). Students will learn the basics of programming, code design, Python and how to develop and complete programming products by using Python.

This course introduces the basic concepts of data structures and algorithms in data structures with the use of Python. Topics introduced in the course include the basics of algorithm analysis, basic data structures (including stack, queue, linked list, hashtable, tree), recursion and some important applications of these data structures and algorithms.

Knowledge about database systems has become an essential part of an education in computer science because database management has evolved from a specialized computer application to a central component of a modern computing environment. The content of this course includes aspects of database management basic concepts, database design, database languages, and database-system implementation. Basing on these contents, the course emphasizes on how to organize, maintain and retrieve efficiently data and information from a DBMS.

This course is for people who are new to software engineering. It's also for those who have already developed software, but wish to gain a deeper understanding of the underlying context and theory of software development practices.

At the end of this course, learners will be able to:

1. Build high-quality and secure software using SDLC methodologies such as agile, lean, and traditional/waterfall.
2. Analyze a software development team's SDLC methodology and make recommendations for improvements.
3. Compare and contrast software development methodologies with respect to environmental, organizational, and product constraints.

This intensive and hands-on course gives learners the skills to ensure their projects are completed on time and on budget while giving the user the product they expect. They will gain a strong working knowledge of the basics of project management and be able to immediately use that knowledge to effectively manage work projects. At the end of the series they will be able to identify and manage the product scope, build a work breakdown structure, create a project plan, create the project budget, define and allocate resources and identify and manage risks, and then they will be able to manage the project development.

This course aims to equip students with full awareness of ethics and responsibility in the IT development process. Students will be provided with the knowledge to create IT products that are effectively designed and in accordance with ethical standards, reducing inequality and promoting equality. The course also helps students develop initiatives that prioritize ethical integrity in the IT sector, especially in the field of emerging technologies such as AI and Data Science.

Students are sent to enterprises in fields related to the training major, experiencing the process of working in the workplace under the program agreed by FPT University and the enterprises. Students will have the opportunity to apply the knowledge and skills gained at university, learn, set goals and decide the narrow specialization taken after the internship.

This course is designed for students who have little or no background in AI, and does not require any programming skills. It is designed to give students a firm understanding of what is AI, its applications and use cases across various industries. Students will become acquainted with terms like Machine Learning, Deep Learning and Neural Networks.

Furthermore, it will familiarize students with IBM Watson AI services that enable any business to quickly and easily employ pre-built AI smarts to their products and solutions. Students will also learn about creating intelligent virtual assistants and how they can be leveraged in different scenarios.

By the end of this specialization, students will have had hands-on interactions with several AI environments and applications, and have built and deployed an AI enabled chatbot on a website – without any coding.

This course introduces the mathematical concepts and foundations required for the three main components of machine learning systems: data, models, and learning. Through this course, students will be able to understand:

- Basic concepts of matrices and matrix decomposition;
- Concepts of gradients;
- The basis of probability and some distributions;
- Optimization to find maximum and minimum function;
- Dimensionality reduction with Principal Components Analysis (PCA);
- Classification within the scope of the Support Vector Machine (SVM).

This course provides students with solid theoretical knowledge and allows students to practice basic algorithms, the use and best environments for Machine Learning. The course is designed by IBM, and thus students can gain the IBM Machine Learning Professional Certificate.

In this course, students will learn the foundations of Deep Learning, understand how to build neural networks, and learn how to develop effective machine learning projects. Students will learn about convolutional neural networks, RNN, LSTM, Adam, Dropout, BatchNorm, Xavier/He initialization, etc. Students will work on case studies from healthcare, autonomous driving, sign language reading, music creation, and natural language processing. Students will not only master the theory but also see how it is applied in the industry. These contents will be distributed in 2 modules namely DLP301m -1 and DLP301m-2.

Students will learn how Reinforcement Learning (RL) helps solve real-world problems through trial-and-error interaction by implementing a complete RL solution. The tools learned in this course can be applied to game development (AI), customer interaction (the way websites interact with customers), smart assistants, referral systems, supply chains, industrial control, finance, oil and gas pipelines, industrial control systems, and more.

In this course, students will be equipped with an overview of data science, the most popular data science tools (Jupyter Notebooks, JupyterLab, RStudio IDE, Git, GitHub and Watson Studio), their features and programming languages. In addition to the methodologies used in data science, students will also learn about statistical methods and procedures used to analyze data. The course also covers concepts of relational databases, basic knowledge of SQL, performing SQL access in a data science environment and programming data science with Python.

The focus of this course is on the practice of data science in large, modern enterprises. Students will be guided through the use of enterprise-class tools on the IBM Cloud, tools that they will use to create, deploy and test machine learning models. Open source tools, such as Jupyter notebooks and Python libraries, will be used for data preparation and building models. Models will be deployed on the IBM Cloud using IBM Watson tooling that works seamlessly with open source tools.

Students will use the foundational skills of Python to develop AI applications. They will be able to write an application that leverages multiple Watson AI services (Discovery, Speech to Text, Assistant, and Text to Speech) and learn best practices of combining Watson services, and how they can build interactive information retrieval systems with Discovery + Assistant. Learn how to analyze data using Python, visualize data in Python using several Python data visualization libraries namely Matplotlib, Seaborn and Folium. The projects will provide students with a real perspective on what data scientists experience when working with real data sets.

Students will skill up with the tools and technologies that successful software developers use to build, deploy, test, run, and manage Full Stack Cloud Native. The course will help students develop skill sets in a variety of technologies including: Cloud foundations, HTML, CSS, JavaScript, GitHub, Node.js, React, Cloud Native practices, DevOps, CI/CD, Containers, Docker, Kubernetes, OpenShift, Istio, Python programming, Databases, SQL, NoSQL, Django ORM, Bootstrap, Application Security, Microservices, Serverless computing, and more.

Students will learn the necessary tools to build scalable AI-powered applications with TensorFlow. Students can apply their knowledge of TensorFlow to projects, such as building and training neural networks using TensorFlow, improving network performance, making machines understand, analyze, and respond to human speech by natural language processing, text processing.

This course provides the basics of computer vision.

- Students will have access to knowledge from image representation, lighting, image acquisition through the camera, camera calibration techniques.
- Learn line and edge detection techniques in images, filters as well as Canny, RANSAC methods
- Students will learn advanced image processing knowledge such as Image segmentation, object detection, object recognition, and object tracking.
- Implement a computer vision project in recognizing objects in photos or videos

Natural Language Processing (NLP) uses algorithms to understand and manipulate human language. This technology is one of the most broadly applied areas of machine learning. As AI continues to expand, so will the demand for professionals skilled at building models that analyze speech and language, uncover contextual patterns, and produce insights from text and audio.

By the end of this Specialization, students will be ready to design NLP applications that perform question-answering and sentiment analysis, create tools to translate languages and summarize text, and even build chatbots.

The Capstone Project provides students, working in groups, with a significant project experience in which they can integrate much of the material they have learned in their program, including matters relating to requirements, design, human factors, professionalism, and project management.

Students will be guided to develop an AI system, employing knowledge gained from courses throughout the program. They will fully engage in the process of designing an AI solution. Starting with a systematic analysis of creative ideas, students will apply the skills they learned by designing, building, and testing an AI system. Success of the project is determined in large part by whether students have adequately solved their customer's problem.

Students will develop the skills you need to bring together often disparate and disconnected data sources and use the R programming language to transform data into insights that help you and your stakeholders make more informed decisions. Students will be able to perform basic R programming tasks to complete the data analysis process, create relational databases and query the data using SQL and R and communicate their data findings using data visualization techniques. Students will work with tools like R Studio, Jupyter Notebooks, and related R libraries for data science, including dplyr, Tidyverse, Tidymodels, R Shiny, ggplot2, Leaflet, and rvest.

Through this course, students will gain an understanding of what insights big data can provide through hands-on experience with the tools and systems used by big data scientists and engineers. This course will prepare students to ask the right questions about data, communicate effectively with data scientists, and do basic exploration of large, complex datasets. In the final Capstone Project, students will apply the skills they learned to do basic analyses of big data.

This course teaches data mining techniques for both structured data which conform to a clearly defined schema, and unstructured data which exist in the form of natural language text. Specific course topics include pattern discovery, clustering, text retrieval, text mining and analytics, and data visualization. .

This course allows students to apply the knowledge that has been equipped in Data Science regarding R language, big data, data mining to collect, analyze and evaluate data, visualize and model on real-world data sets, as well as fundamental analysis of big data.

This course studies the theory, design, and implementation of text-based search engines. The core components include statistical characteristics of text, representation of information needs and documents, several important retrieval models, and experimental evaluation. The course also covers common elements of commercial search engines, for example, integration of diverse search engines into a single search service (federated search, vertical search), personalized search results, diverse search results. The software architecture components include design and implementation of large-scale, distributed search engines.



This course is a combination of core theory, algorithms, evaluation methods, and the application of scalable data analysis techniques. Students will be equipped with dimensional vector spaces and scalable algorithms, association analysis, neural learning of text representation, matrix factorization method, collaborative filtering and social network analysis, web-scale text classification and graph-based learning.

This course provides a practical and theoretical understanding of how computers can process human speech. It includes speech recognition, speech synthesis and spoken dialogue systems. Students will build speech recognition systems, create their own synthetic voice and a complete spoken dialogue system based on existing toolkits. Details of algorithms, techniques and limitations of modern speaking systems will also be covered.

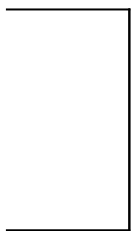
This course covers signal processing techniques specialized for handling 2D (images) and 3D (videos) signals. Students will learn fundamental tools and techniques for processing images and videos, and will learn to apply them to a range of practical applications. Specific focus will be on transform-domain, PDE and sparsity-based models and associated optimization techniques. These techniques will be enriched via applications in mobile devices, medical image processing, and compressive sensing.

This course will provide students with the basics of using Big Data, Artificial Intelligence, and Machine Learning and different fields to deploy and support to solve business problems. Students will learn how to use data analytics and how personalization can improve and extend the customer journey and lifecycle, and gain insights into how AI and Big Data are revolutionizing the way we do business.

This course will discuss the current and future applications of AI in healthcare with the goal of learning to bring AI technologies into the clinic safely and ethically.

This course will provide students with practical experience in applying machine learning to specific problems in medicine. Students will begin by working with 2D and 3D medical image data and then apply tree-based models to improve period survival estimates of patients, using data from randomized trials to recommend treatments that are more appropriate for each patient, discovering how natural language extraction can label medical datasets more effectively.

This module will show students how to create quantitative and algorithmic trading strategies using Python. By the end of the course, students will be able to create and enhance quantitative trading strategies by using machine learning. Students will also learn how to use deep learning and reinforcement learning strategies to create algorithms that can update and train themselves.



**Phụ lục 2b**  
**CÁC HỌC PHẦN TỰ CHỌN (COMBO) CHUYÊN NGÀNH TRÍ TUỆ NHÂN TẠO, NGÀNH CNTT**  
**(Áp dụng từ khóa sinh viên 16Đ & 17A)**  
*(Ban hành theo Quyết định số 205/QĐ-ĐHFPT ngày 08 tháng 03 năm 2022 của Hiệu trưởng Trường Đại học F)*

TT	Mã HP	Tên HP	Số TC
<b>I. Nhóm các môn Combo</b>			
<b>1.1 Nhóm môn Combo chuyên ngành TTNT</b>			
<b>AI_COM1</b>		<b>Chủ đề Khoa học dữ liệu (KHDL) ứng dụng</b>	
	DSR301m	Khoa học dữ liệu (KHDL) ứng dụng với R_Applied DS with R	3
	BDI301c	Dữ liệu lớn_Big Data	3
	DBM302m	Khai phá dữ liệu_Data Mining	3
	DSP391m	Dự án KHDL_Data Science - Capstone Project	3
<b>AI_COM2</b>		<b>Chủ đề Định hướng nghiên cứu ứng dụng TTNT</b>	
	SEG301m	Công cụ tìm kiếm_Search Engines	3
	TMG301m	Khai thác văn bản_Text Mining	3
	SLP301m	Xử lý tiếng nói_Speech Processing	3
	IMP302m	Xử lý hình ảnh và video_Image & Video processing	3
<b>AI_COM3</b>		<b>Chủ đề Ứng dụng TTNT</b>	
	AIB301c	Ứng dụng TTNT cho thương mại_AI for Business	3
	AIH301m	Ứng dụng TTNT trong chăm sóc sức khỏe_AI in Healthcare	3
	AIM301m	Ứng dụng TTNT cho y học_AI for Medicine	3

	AID301m	Ứng dụng CNTT cho giao dịch_AI for Trading	3
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## 1.2 Nhóm môn Combo Giáo dục thể chất\_Physical Education

<b>PHE_COM1</b>	<b>Vovinam</b>		
	VOV114	Vovinam 1	2
	VOV124	Vovinam 2	2
	VOV134	Vovinam 3	2
<b>PHE_COM2</b>	<b>Cờ Vua</b>		
	COV111	GDTC – Môn Cờ Vua 1_Chess 1	2
	COV121	GDTC – Môn Cờ Vua 2_Chess 2	2
	COV131	GDTC – Môn Cờ Vua 3_Chess 3	2

## II. Nhóm các môn Elective

<b>TMI_ELE</b>	<b>Nhạc cụ truyền thống_ Traditional musical instrument</b>		
	<i>Sinh viên được chọn một trong các môn học sau:</i>		
	ĐTR102	Nhạc cụ truyền thống-Đàn Tranh/Traditional musical instrument-Đàn Tranh	3
	ĐBA102	Nhạc cụ truyền thống-Đàn Bầu/Traditional musical instrument-Đàn Bầu	3
	ĐNG102	Nhạc cụ truyền thống-Đàn nguyệt/Traditional musical instrument-Đàn nguyệt	3
	ĐNH102	Nhạc cụ truyền thống-Đàn Nhị/Traditional musical instrument-Đàn Nhị	3
	ĐSA102	Nhạc cụ truyền thống- Sáo trúc/Traditional musical instrument-Sáo trúc	3
	ĐTB102	Nhạc cụ truyền thống-Đàn Tỳ bà/Traditional musical instrument-Đàn Tỳ bà	3
	TRG102	Nhạc cụ truyền thống- Trống dân tộc/Traditional musical instrument-Trống dân tộc	3

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Phụ lục 2c

**DANH SÁCH CÁC HỌC PHẦN SỬ DỤNG TÀI NGUYÊN MOOC (**  
**(Áp dụng từ khóa sinh vi**  
*(Ban hành theo Quyết định số 205/QĐ-ĐHFPT ngày 08 tháng 1*

Stt	Mã	Tên học phần	
1	ADY201m	TTNT và KHDL với Python và SQL	AI, DS with Python & SQL (7 courses)
2	AID301c	Thiết kế sản phẩm TTNT	AI in Production
3	AIG201c	Trí tuệ nhân tạo	Artificial Intelligence Foundation
4	AIL303m	Học máy	Machine Learning (IBM)



5	DAT301m	Phát triển UDTTNT với TensorFlow	AI Development with TensorFlow
6	DPL302m	Học sâu	Deep Learning (deeplearning.ai)
7	DWP301c	Phát triển web với Python	Web Development with Python
8	ENW492c	Kỹ năng viết học thuật	Academic Writing Skills
9	ITE303c	Đạo đức trong CNTT	LearnQuest: Ethics in the Age of AI Specialization
10	NLP301c	Xử lý ngôn ngữ tự nhiên	Natural Language Processing (deeplearning.ai)
11	DAP391m	Dự án TTNT-KHDL	AI-DS Project (5 courses)
12	PMG202c	Quản trị dự án	Google Project Management: Professional Certificate (Google)
13	SSL101c	Kỹ năng học tập đại học	Academic Skills for University Success (The University of Sydney)
14	SWE201c	Nhập môn kỹ thuật phần mềm	Software Development Lifecycle (University of Minnesota)
	<b>Các môn (dự kiến)</b>		
15	AIB301c	Ứng dụng TTNT cho thương mại	AI for Business
16	AID301m	Ứng dụng TTNT cho giao dịch	AI for Trading

17	AIH301m	Ứng dụng TTNT trong chăm sóc sức khỏe	AI in Healthcare
18	AIM301m	Ứng dụng TTNT cho y học	AI for Medicine
19	BDI301c	Dữ liệu lớn	Big Data
20	DBM302m	Khai phá dữ liệu	Data Mining
21	DSP391m	Dự án KHDL	Data Science - Capstone Project
22	DSR301m	Khoa học dữ liệu (KHDL) ứng dụng với R	Applied DS with R
23	IMP302m	Xử lý hình ảnh và video	Image & Video processing
24	SEG301m	Công cụ tìm kiếm	Search Engines
25	SLP301m	Xử lý tiếng nói	Speech Processing
26	TMG301m	Khai thác văn bản	Text Mining

CHUYÊN NGÀNH TRÍ TUỆ NHÂN TẠO, NGÀNH CNTT  
 ên 16D & 17A)  
 03 năm 2022 của Hiệu trưởng Trường Đại học FPT)

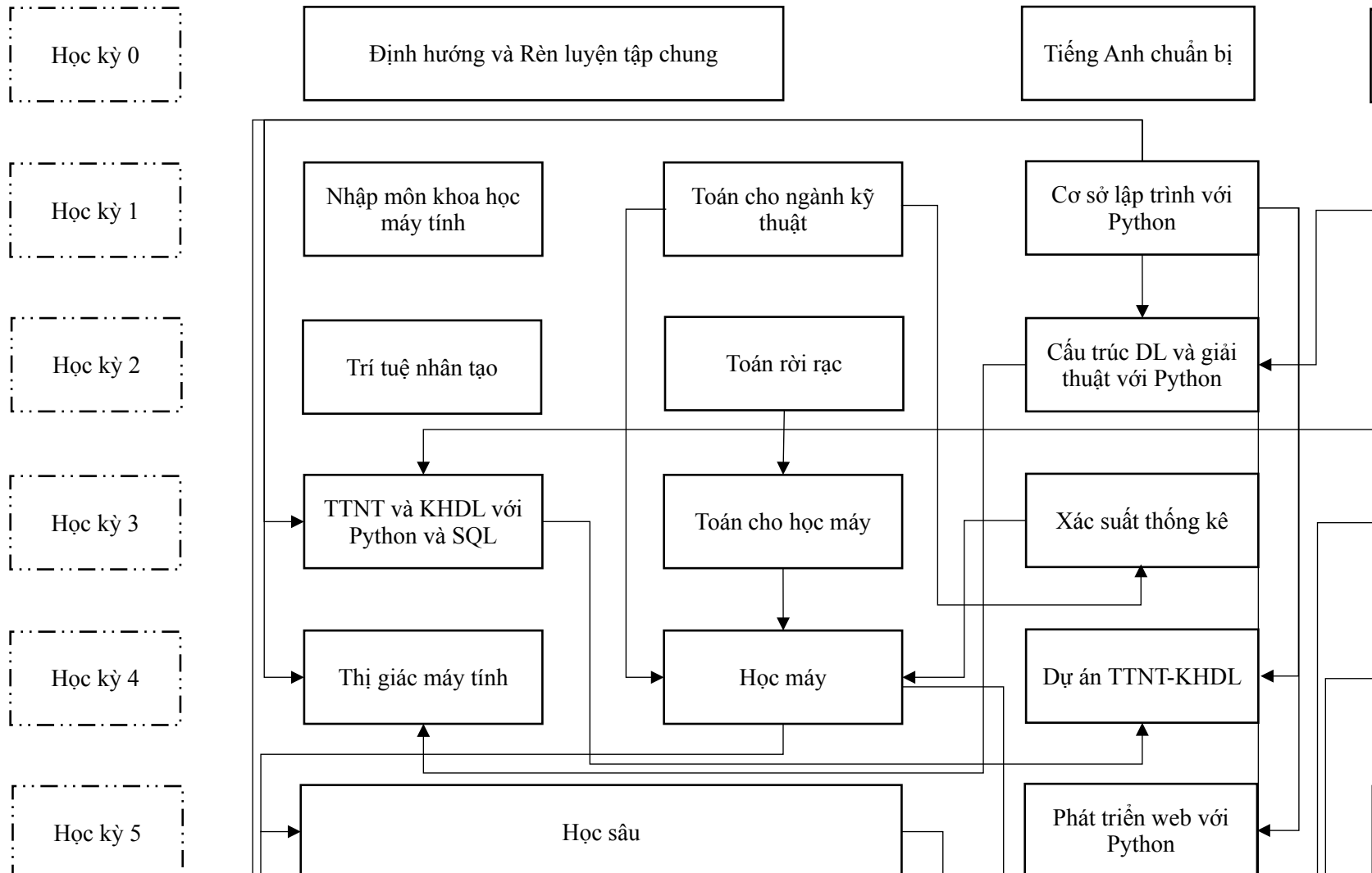
Link	Notes
<b>What is Data Science?</b> <a href="https://www.coursera.org/learn/what-is-datascience?specialization=ibm-data-science">https://www.coursera.org/learn/what-is-datascience?specialization=ibm-data-science</a>	Sinh viên có thêm nhiệm vụ complete các khóa học online tương ứng (để thu được các chứng chỉ Specs.)
<b>Tools for Data Science</b> <a href="https://www.coursera.org/learn/open-source-tools-for-data-science?specialization=ibm-data-science">https://www.coursera.org/learn/open-source-tools-for-data-science?specialization=ibm-data-science</a>	
<b>Data Science Methodology</b> <a href="https://www.coursera.org/learn/data-science-methodology?specialization=ibm-data-science">https://www.coursera.org/learn/data-science-methodology?specialization=ibm-data-science</a>	
<b>Python for Data Science, AI &amp; Development</b> <a href="https://www.coursera.org/learn/python-for-applied-data-science-ai?specialization=ibm-data-science">https://www.coursera.org/learn/python-for-applied-data-science-ai?specialization=ibm-data-science</a>	
<b>Python Project for Data Science</b> <a href="https://www.coursera.org/learn/python-project-for-data-science?specialization=ibm-data-science">https://www.coursera.org/learn/python-project-for-data-science?specialization=ibm-data-science</a>	
<b>Statistics for Data Science with Python</b> <a href="https://www.coursera.org/learn/statistics-for-data-science-python">https://www.coursera.org/learn/statistics-for-data-science-python</a>	
<b>Databases and SQL for Data Science with Python</b> <a href="https://www.coursera.org/learn/sql-data-science">https://www.coursera.org/learn/sql-data-science</a>	
<a href="https://www.coursera.org/specializations/ibm-ai-workflow">https://www.coursera.org/specializations/ibm-ai-workflow</a>	
<a href="https://www.coursera.org/specializations/ai-foundations-for-everyone">https://www.coursera.org/specializations/ai-foundations-for-everyone</a>	
<a href="https://www.coursera.org/specializations/ibm-intro-machine-learning">https://www.coursera.org/specializations/ibm-intro-machine-learning</a>	

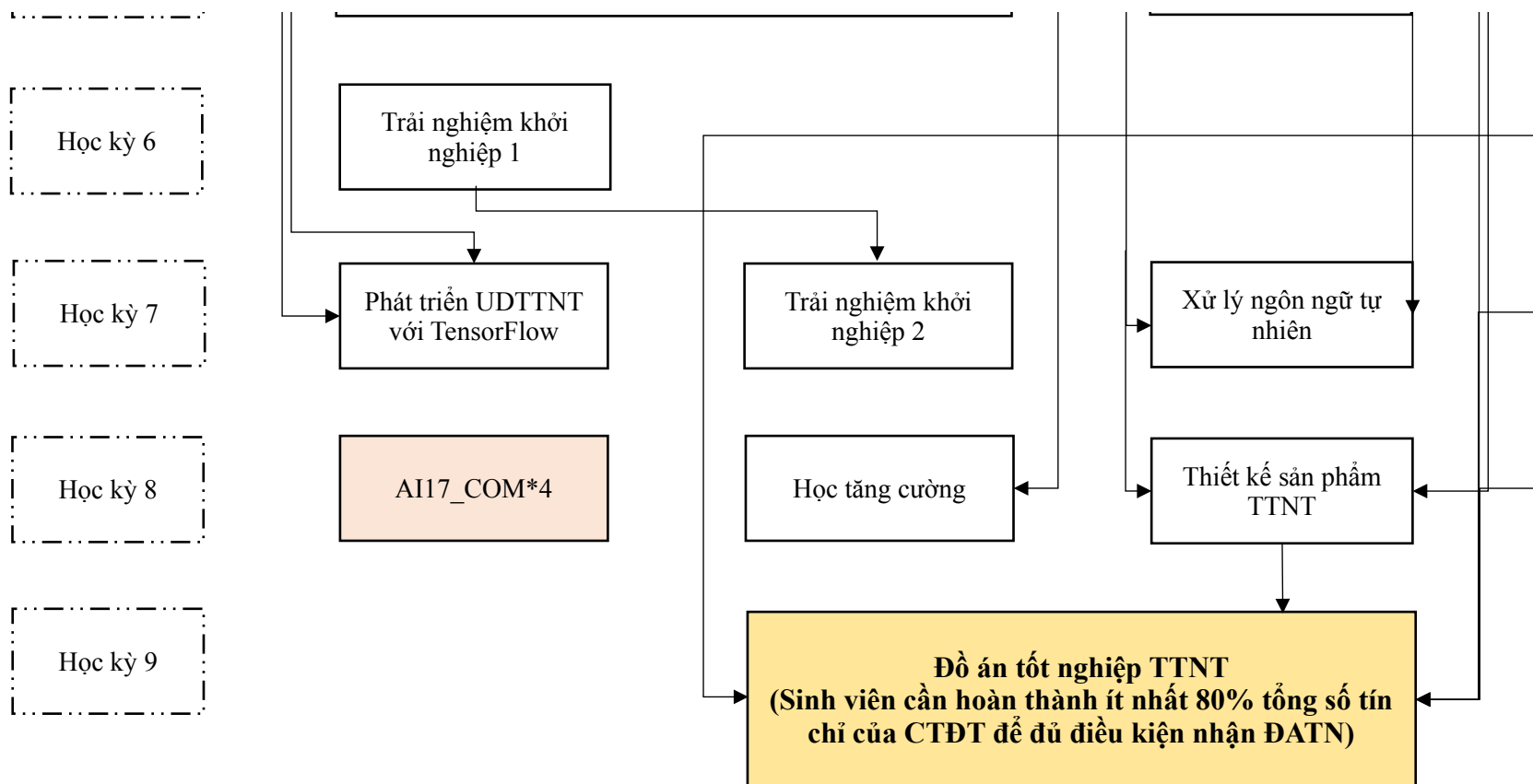
<a href="https://www.coursera.org/professional-certificates/tensorflow-in-practice">https://www.coursera.org/professional-certificates/tensorflow-in-practice</a>	
<a href="https://www.coursera.org/specializations/deep-learning">https://www.coursera.org/specializations/deep-learning</a>	
<b>Option 1</b> Full stack web development and AI with Python (Django), Udemy <b>Option 2</b> IBM Full Stack Cloud Developer Professional Certificate, Coursera	
<a href="https://www.coursera.org/specializations/academic-english">https://www.coursera.org/specializations/academic-english</a>	
<a href="https://www.coursera.org/specializations/ethics-in-ai">https://www.coursera.org/specializations/ethics-in-ai</a>	
<a href="https://www.coursera.org/specializations/natural-language-processing?">https://www.coursera.org/specializations/natural-language-processing?</a>	
<b>Python Project for AI &amp; Application Development</b> <a href="https://www.coursera.org/learn/python-project-for-ai-application-development">https://www.coursera.org/learn/python-project-for-ai-application-development</a>  <b>Building AI Applications with Watson APIs</b> <a href="https://www.coursera.org/learn/building-ai-applications">https://www.coursera.org/learn/building-ai-applications</a>  <b>Data Analysis with Python</b> <a href="https://www.coursera.org/learn/data-analysis-with-python">https://www.coursera.org/learn/data-analysis-with-python</a>  <b>Data Visualization with Python</b> <a href="https://www.coursera.org/learn/python-for-data-visualization">https://www.coursera.org/learn/python-for-data-visualization</a>  <b>Applied Data Science Capstone</b> <a href="https://www.coursera.org/learn/applied-data-science-capstone">https://www.coursera.org/learn/applied-data-science-capstone</a>	Sinh viên có thêm nhiệm vụ complete các khóa học online tương ứng (để thu được các chứng chỉ Specs.)
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<a href="https://www.coursera.org/specializations/academic-skills">https://www.coursera.org/specializations/academic-skills</a>	
<a href="https://www.coursera.org/specializations/software-development-lifecycle">https://www.coursera.org/specializations/software-development-lifecycle</a>	
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<a href="https://www.coursera.org/specializations/ai-for-business-wharton">https://www.coursera.org/specializations/ai-for-business-wharton</a>	
<a href="https://www.coursera.org/specializations/machine-learning-trading">https://www.coursera.org/specializations/machine-learning-trading</a>	

<a href="https://www.coursera.org/specializations/ai-healthcare">https://www.coursera.org/specializations/ai-healthcare</a>	
<a href="https://www.coursera.org/specializations/ai-for-medicine">https://www.coursera.org/specializations/ai-for-medicine</a>	
<a href="https://www.coursera.org/specializations/big-data">https://www.coursera.org/specializations/big-data</a>	
<a href="https://www.coursera.org/specializations/data-mining">https://www.coursera.org/specializations/data-mining</a>	
<a href="https://www.coursera.org/specializations/applied-data-science-r">https://www.coursera.org/specializations/applied-data-science-r</a>	
<a href="https://www.coursera.org/specializations/big-data">https://www.coursera.org/specializations/big-data</a>	
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<a href="https://www.coursera.org/specializations/applied-data-science-r">https://www.coursera.org/specializations/applied-data-science-r</a>	
<a href="https://courses.ece.cmu.edu/18793">https://courses.ece.cmu.edu/18793</a>	
<a href="https://boston.lti.cs.cmu.edu/classes/11-642/">https://boston.lti.cs.cmu.edu/classes/11-642/</a>	
<a href="http://tts.speech.cs.cmu.edu/courses/11492/schedule.html">http://tts.speech.cs.cmu.edu/courses/11492/schedule.html</a>	
<a href="http://www.cs.cmu.edu/~yiming/MLTM-f20-index.htm">http://www.cs.cmu.edu/~yiming/MLTM-f20-index.htm</a>	

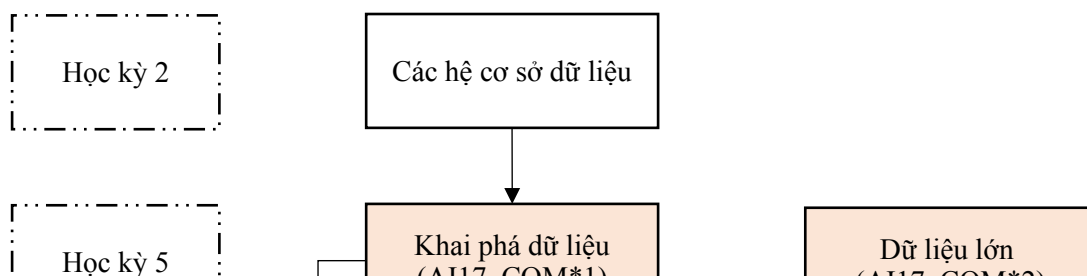
# SƠ ĐỒ BIỂU DIỄN ĐIỀU KIỆN TIỀN QUYẾT CỦA CÁC HỌC PHẦN TRONG CTI (Áp dụng từ khóa sinh viên 16D & 17A)

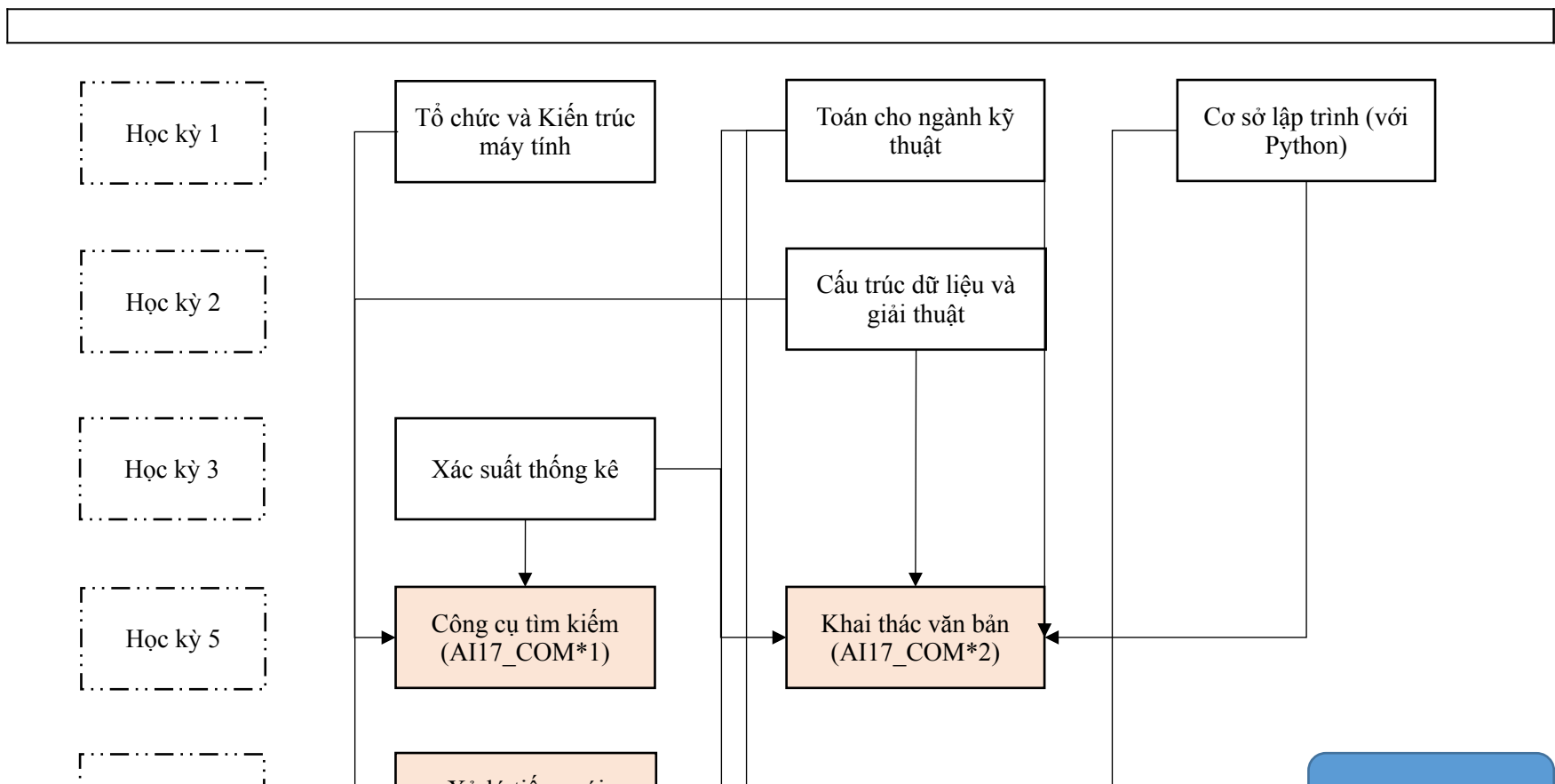
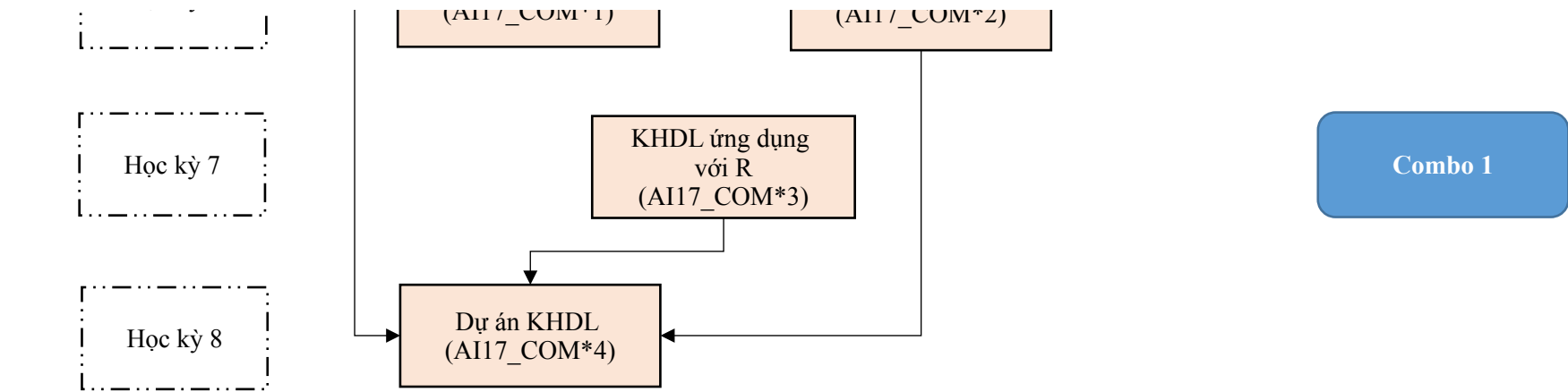
(Ban hành theo Quyết định số 205/QĐ-ĐHFPT ngày 08 tháng 03 năm 2022 của)



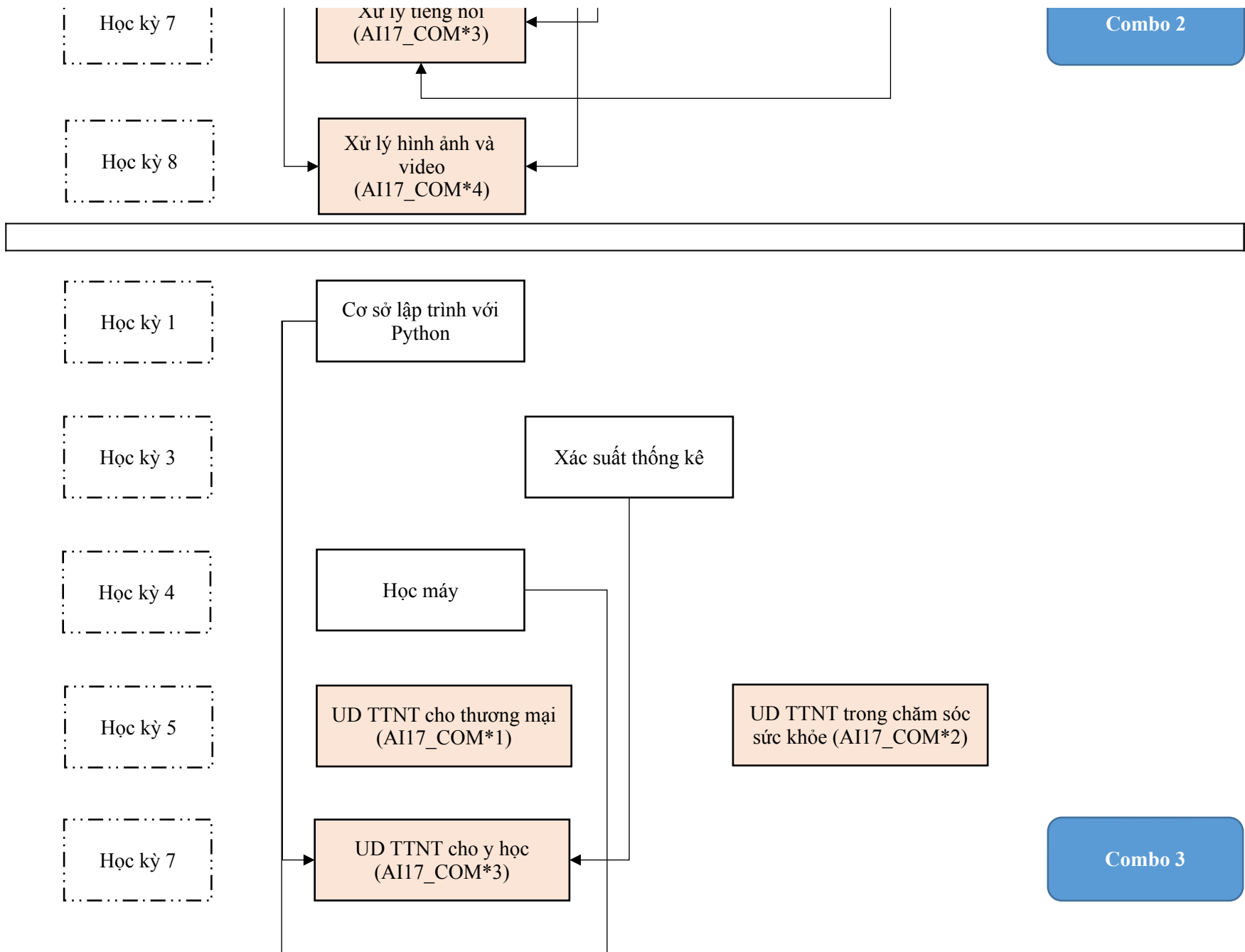


**Sơ đồ học phần tiên quyết của các Combo**  
 (Sinh viên cần hoàn thành 100% số lượng các môn trong Combo để







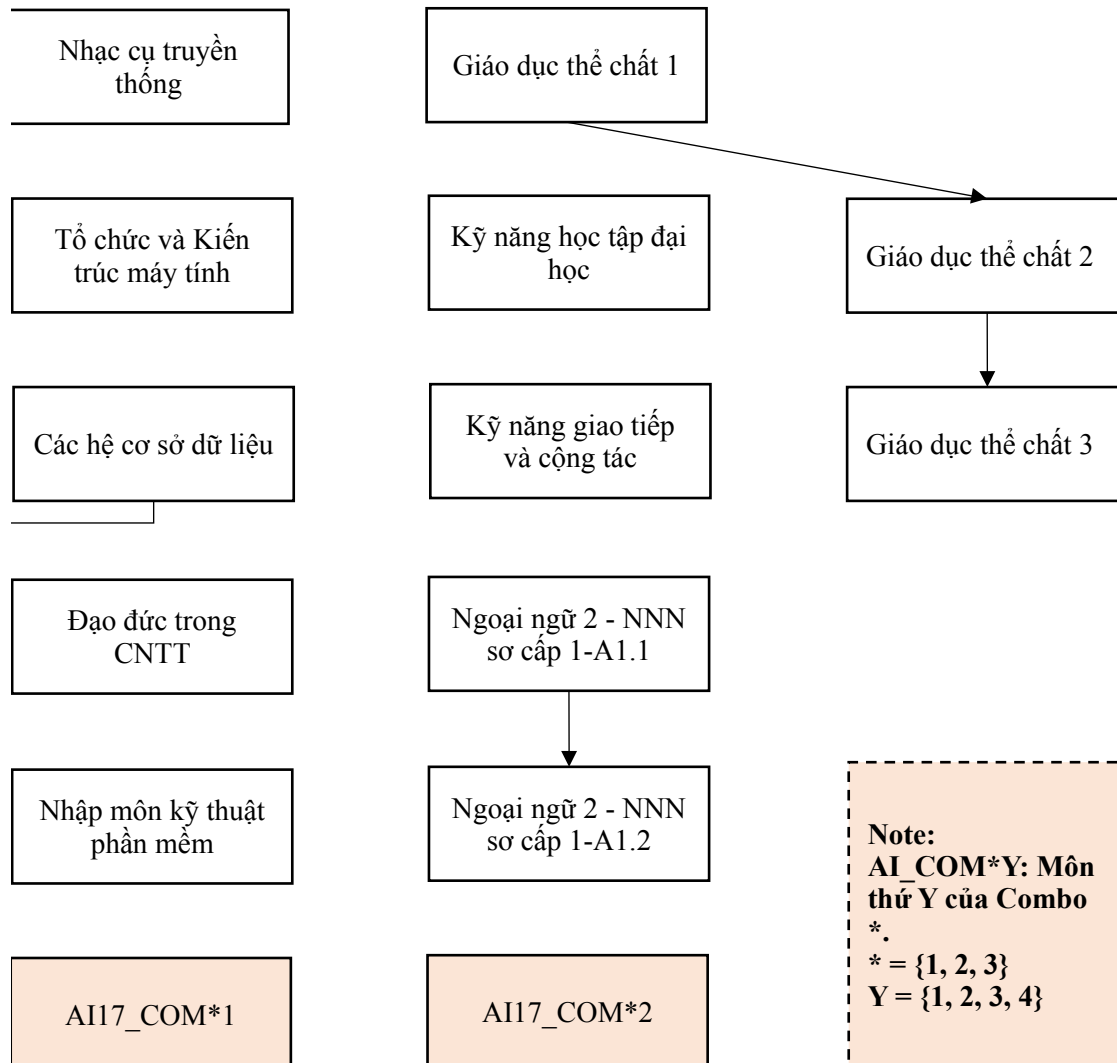


Học kỳ 8



## ĐT NGÀNH CNTT CHUYÊN NGÀNH TTNT

a Hiệu trưởng Trường Đại học FPT)



**Đào tạo trong môi trường thực tế**  
**(Sinh viên cần đạt 90% tổng số tín chỉ từ Kỳ 1 - Kỳ 5, không gồm GDTC, GDQP)**

Kỹ năng viết học  
thuật

AI17\_COM\*3

Quản trị dự án

Triết học Mác-  
Lênin

Kinh tế chính trị  
Mác-Lênin

Chủ nghĩa xã hội  
khoa học

Tư tưởng HCM

Lịch sử Đảng Cộng  
sản VN

0  
đủ điều kiện nhận ĐATN)

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