

FULL-TIME UNDERGRADUATE PROGRAMME

(Issued together with Decision No. 1495/QĐ-ĐHNH dated 13 May 2026
of the Rector of Ho Chi Minh University of Banking)

Programme name in Vietnamese: KHOA HỌC DỮ LIỆU

Programme name in English: DATA SCIENCE

Qualification level: Undergraduate

Field of study: DATA SCIENCE

Field of study code¹: 7460108

Mode of study: Full-time, on campus

Entry requirements: In accordance with the admissions scheme

Designed programme duration: 04 years (08 semesters)

Programme revision date: May 2026

1. Programme Objectives (POs)

1.1. General Objective (PO)

Graduates of the Data Science programme demonstrate professional ethics and social responsibility; possess the knowledge and skills in data science needed for effective application in business; and are capable of solving problems in the era of the Fourth Industrial Revolution.

1.2. Specific Objectives (POi)

PO1: Apply knowledge of the natural sciences, social sciences, politics and law, together with specialised professional knowledge, to perform tasks in the field of study.

PO2: Demonstrate personal and professional qualities and the ability to plan career development in response to changes in the economic and social environment and international integration.

PO3: Demonstrate thinking, creativity, critical thinking, teamwork and professional communication skills in professional activities.

PO4: Demonstrate foreign language and information technology competence appropriate to a professional working environment and international integration.

PO5: Proficiently apply, identify and design solutions for the application of data science in business.

2. Programme Learning Outcomes (PLOs) and Performance Indicators (PIs)

Upon completion of the Data Science programme at Ho Chi Minh University of Banking, graduates are able to: ²

PLO code	PI code (PIi)	PLO/PI DESCRIPTION	Attainment level ³	NOTES
PLO1		Possess basic knowledge of the natural sciences, social sciences, politics and law and apply it to everyday issues and professional activities.	3	
	PI 1.1	Apply basic knowledge of the social sciences, politics and law appropriately in social and professional contexts.	3	
	PI 1.2	Apply basic knowledge of the natural sciences to calculation, design, analysis, reasoning and explanation of issues in professional practice.	3	
PLO2		Apply critical thinking to solving professional problems.	4	
	PI 2.1	Analyse information, evaluate options and make decisions through reasoning and critical thinking.	4	

¹ The field of study code is specified according to the list of field codes prescribed by the Ministry of Education and Training.

² Each PLO contains a maximum of four components; each component is measured by one PI.

³ According to the competency scale.

PLO code	PI code (PI _n)	PLO/PI DESCRIPTION	Attainment level ³	NOTES
	PI 2.2	Identify problems in professional situations in order to solve them.	4	
PLO3		Work in teams and communicate effectively under changing working conditions and in the context of international integration.	4	
	PI 3.1	Initiate, implement and complete team tasks, behave appropriately and develop a sense of responsibility within the team.	4	
	PI 3.2	Communicate effectively in the workplace and in the context of international integration.	4	
PLO4		Demonstrate initiative and active engagement in learning, research and the management of personal resources to meet lifelong learning needs.	4	
	PI 4.1	Organise and manage personal resources to complete learning tasks.	4	
	PI 4.2	Participate in and demonstrate a commitment to learning and research, and adapt to meet lifelong learning needs.	4	
PLO5		Demonstrate ethics, professional responsibility, professional conduct, and responsibility towards society and the community.	4	
	PI 5.1	Comply with legal requirements and ethical standards in professional practice.	4	
	PI 5.2	Demonstrate professionalism in communication, behaviour and the handling of workplace situations.	4	
	PI 5.3	Contribute to and demonstrate responsibility towards society and the community, and show an entrepreneurial spirit.	4	
PLO6		Proficiently apply foundational and specialised knowledge to solve professional problems.	4	
	PI 6.1	Proficiently apply foundational knowledge to solve professional problems.	4	
	PI 6.2	Proficiently apply specialised knowledge to solve professional problems.	4	
PLO7		Identify applicable solutions within the discipline and across disciplines.	4	
	PI 7.1	Identify applicable solutions within the discipline.	4	
	PI 7.2	Identify applicable solutions across disciplines.	4	
PLO8		Adapt to changing trends in professional and occupational fields.	4	
	PI 8.1	Identify current and emerging trends in professional and occupational fields.	4	
	PI 8.2	Analyse the risks and opportunities associated with changing trends in professional and occupational fields.	4	
PLO9		Demonstrate English language proficiency at least equivalent to intermediate Level 3/6 of the Six-level Foreign Language Proficiency Framework for Vietnam (under Circular No. 01/2014/TT-BGDT). For the high-quality programme (TABP): Level 4/6.	4	
PLO10		Possess advanced information technology knowledge to solve problems in professional and occupational fields.	4	
	PI 10.1	Use information technology applications in professional practice.	3	
	PI 10.2	Apply advanced information technology to solve problems in professional and occupational fields.	4	
PLO11		Possess knowledge and skills in the application of data science in business.	4 (TABP programme: Level 5)	
	PI 11.1	Collect, analyse and manage data systems to support data-driven business decisions.	4	
	PI 11.2	Develop data-driven products and services to meet market needs.	4	
	PI 11.3	Use tools and algorithms in business analytics in the digital economy.	4	

3. Alignment Matrix of Programme Objectives (POi) and Programme Learning Outcomes (PLOs)

The relationship between programme objectives and programme learning outcomes shown below indicates that students can achieve the programme objectives by meeting the programme learning outcomes.

Programme objectives (POi)		Programme learning outcomes (PLOs) (Mark relevant cells with X)										
		1	2	3	4	5	6	7	8	9	10	11
General objective:												
Graduates of the Data Science programme demonstrate professional ethics and social responsibility; possess the knowledge and skills in data science needed for effective application in business; and are capable of solving problems in the era of the Fourth Industrial Revolution.												
Specific objectives:												
PO1	Apply knowledge of the natural sciences, social sciences, politics and law, together with specialised professional knowledge, to perform tasks in the field of study.	X					X	X				X
PO2	Demonstrate personal and professional qualities and the ability to plan career development in response to changes in the economic and social environment and international integration.				X	X						
PO3	Demonstrate thinking, creativity, critical thinking, teamwork and professional communication skills in professional activities.		X	X								
PO4	Demonstrate foreign language and information technology competence appropriate to a professional working environment and international integration.									X	X	
PO5	Proficiently apply, identify and design solutions for the application of data science in business.						X	X	X			X

Alignment matrix of POs, PLOs and PIs.⁴

PO	PLO	PI
PO1: Apply knowledge of the natural sciences, social sciences, politics and law, together with specialised professional knowledge, to perform tasks in the field of study.	PLO1: Possess basic knowledge of the natural sciences, social sciences, politics and law and apply it to everyday issues and professional activities.	PI 1.1: Apply basic knowledge of the social sciences, politics and law appropriately in social and professional contexts.
		PI 1.2: Apply basic knowledge of the natural sciences to calculation, design, analysis, reasoning and explanation of issues in professional practice.
	PLO6: Proficiently apply foundational and specialised knowledge to solve professional problems.	PI 6.1: Proficiently apply foundational knowledge to solve professional problems.
		PI 6.2: Proficiently apply specialised knowledge to solve professional problems.
	PLO7: Identify applicable solutions within the discipline and across disciplines.	PI 7.1: Identify applicable solutions within the discipline.
		PI 7.2: Identify applicable solutions across disciplines.
	PLO11: Possess knowledge and skills in the application of data science in business.	PI 11.1: Collect, analyse and manage data systems to support data-driven business decisions.
		PI 11.2: Develop data-driven products and services to meet market needs.
		PI 11.3: Use tools and algorithms in business analytics in the digital economy.
PO2: Demonstrate personal and professional qualities and the ability to plan career development in response to changes in the economic and social environment and international integration.	PLO4: Demonstrate initiative and active engagement in learning, research and the management of personal resources to meet lifelong learning needs.	PI 4.1: Organise and manage personal resources to complete learning tasks.
		PI 4.2: Participate in and demonstrate a commitment to learning and research, and adapt to meet lifelong learning needs.
	PLO5: Demonstrate ethics, professional responsibility, professional conduct, and responsibility towards society and the community.	PI 5.1: Comply with legal requirements and ethical standards in professional practice.
		PI 5.2: Demonstrate professionalism in communication, behaviour and the handling of workplace situations.
		PI 5.3: Contribute to and demonstrate responsibility towards society and the community, and show an entrepreneurial spirit.
PO3: Demonstrate thinking, creativity, critical thinking, teamwork and professional communication skills in professional activities.	PLO2: Apply critical thinking to solving professional problems.	PI 2.1: Analyse information, evaluate options and make decisions through reasoning and critical thinking.
		PI 2.2: Identify problems in professional situations in order to solve them.
	PLO3: Work in teams and communicate effectively under changing working conditions and in the context of international	PI 3.1: Initiate, implement and complete team tasks, behave appropriately and develop a sense of responsibility within the team.

⁴ Benchmarking is used to examine the alignment with each specific programme objective (PO), as reflected through the Programme Learning Outcomes (PLOs) and Performance Indicators (PIs).

PO	PLO	PI
	integration.	PI 3.2: Communicate effectively in the workplace and in the context of international integration.
PO4: Demonstrate foreign language and information technology competence appropriate to a professional working environment and international integration.	PLO9: Demonstrate English language proficiency at least equivalent to intermediate Level 3/6 of the Six-level Foreign Language Proficiency Framework for Vietnam (under Circular No. 01/2014/TT-BGDT). For the high-quality programme (TABP): Level 4/6.	
	PLO10: Possess advanced information technology knowledge to solve problems in professional and occupational fields.	PI 10.1: Use information technology applications in professional practice. PI 10.2: Apply advanced information technology to solve problems in professional and occupational fields.
PO5: Proficiently apply, identify and design solutions for the application of data science in business.	PLO6: Proficiently apply foundational and specialised knowledge to solve professional problems.	PI 6.1: Proficiently apply foundational knowledge to solve professional problems.
		PI 6.2: Proficiently apply specialised knowledge to solve professional problems.
	PLO7: Identify applicable solutions within the discipline and across disciplines.	PI 7.1: Identify applicable solutions within the discipline.
		PI 7.2: Identify applicable solutions across disciplines.
	PLO8: Adapt to changing trends in professional and occupational fields.	PI 8.1: Identify current and emerging trends in professional and occupational fields.
		PI 8.2: Analyse the risks and opportunities associated with changing trends in professional and occupational fields.
	PLO11: Possess knowledge and skills in the application of data science in business.	PI 11.1: Collect, analyse and manage data systems to support data-driven business decisions.
		PI 11.2: Develop data-driven products and services to meet market needs.
		PI 11.3: Use tools and algorithms in business analytics in the digital economy.

4. Alignment Matrix of Programme Learning Outcomes and the Vietnam National Qualifications Framework

Bachelor-level learning outcomes under the Vietnam National Qualifications Framework		Programme learning outcomes (PLOs) (Mark relevant cells with X)										
		1	2	3	4	5	6	7	8	9	10	11
Knowledge:												
KT1	Sound practical knowledge and broad, in-depth theoretical knowledge within the field of study.	X										X
KT2	Basic knowledge of the social sciences, political sciences and law.	X										
KT3	Information technology knowledge that meets job requirements.										X	
KT4	Knowledge of planning, organising and supervising processes in a specific field of activity.						X	X	X			X
KT5	Basic knowledge of managing and administering professional activities.	X					X	X				X
Skills:												
KN1	Skills required to solve complex problems.		X	X								X
KN2	Leadership and entrepreneurship skills, and the ability to create employment for oneself and others.			X		X						
KN3	Critical thinking, critical evaluation and the use of alternative solutions in uncertain or changing environments.		X									
KN4	Skills in evaluating the quality of completed work and the performance of team members.			X	X							
KN5	Skills in communicating problems and solutions to others in the workplace, and in transferring and disseminating knowledge and skills for specific or complex tasks.			X				X	X			
KN6	Foreign language proficiency at Level 3/6 of the Foreign Language Proficiency Framework for Vietnam.									X		
Autonomy and responsibility:												
TCTN 1	Work independently or in teams under changing working conditions, assuming individual and team responsibility.			X	X							
TCTN 2	Guide and supervise others in performing specified tasks.			X			X	X	X			X
TCTN 3	Exercise self-direction, draw professional conclusions and defend personal viewpoints.				X		X	X	X			X
TCTN 4	Plan, coordinate and manage resources, and evaluate and improve the effectiveness of activities.				X		X	X	X			X

5. Career Opportunities after Graduation

Graduates of the Data Science programme may undertake roles in the following occupational groups:

a. Management of operations and development of data science in business

- Business data science analysis, design and management specialist: Collect, analyse, design and manage data systems to support data-driven business decisions.
- Data model development and testing specialist: Develop data models and test their validity and effectiveness in making predictions and business decisions.
- Business data science administrator: Ensure that data science activities, from data acquisition and processing to model deployment, are carried out efficiently and securely.
- Business data science audit and security specialist: Monitor the accuracy and ensure the security of data and data science models.

b. Data design and administration

- Database design and administration specialist: Design and manage databases, ensuring data consistency and security.
- Application development and data programming specialist: Develop applications and interfaces for data access, including data-driven application programming.
- Data analysis and business market forecasting specialist: Use data analysis techniques to identify key insights and forecast business market trends.

c. Analysis and consultancy on data science solutions for business

- Data-driven product and service business specialist: Define and develop data-driven products and services to meet market needs.
- Business data consultant: Advise businesses and provide data-driven solutions to support informed and effective business decisions.

6. Opportunities for Further Study and Professional Development

Depending on graduates' aspirations, opportunities for further study and professional development in Data Science can be divided into two main directions: deeper specialisation and broader knowledge development.

a. Further specialisation

Pursue postgraduate study (a master's or doctoral degree) in Data Science, Computer Science or Artificial Intelligence (AI). Postgraduate study enables graduates to:

- Deepen their knowledge and skills in data science and computing.
- Develop research competence and the ability to solve complex problems.
- Participate in advanced research projects and promote innovation in the field.

b. Development in related fields

Alongside advancement in their core discipline, graduates may also develop interests, knowledge and skills in related fields. Potential directions include:

- Data analytics: Study more advanced data analysis techniques to become a data analysis specialist, particularly in fields such as finance, marketing and business.
- Data scientist: Focus on practical work in data collection, processing and analysis in business or industrial environments.
- Development of data-driven expert systems: Develop knowledge of artificial intelligence and build expert systems or machine learning systems to support data-driven decision-making.

7. Total Programme Workload

The workload of the full-time undergraduate programme in Data Science comprises:

- General and professional education: 125 credits.
- Physical Education: 05 credits; National Defence and Security Education: 08 credits.

Grades for general and professional education courses are used to calculate the cumulative grade point average and determine the graduation classification. Physical Education and National Defence and Security Education are

graduation requirement courses and are excluded from the cumulative grade point average and graduation classification.

8. Admission Eligibility

Applicants must hold an upper secondary school graduation diploma or an equivalent qualification in accordance with Ministry of Education and Training regulations.

Applicants apply in accordance with the University's admissions regulations and Ministry of Education and Training requirements for annual full-time undergraduate admissions.

9. Programme Delivery and Graduation Requirements

Programme delivery complies with the current regulations of the Ministry of Education and Training and Ho Chi Minh University of Banking on undergraduate education. The programme is designed to comprise 08 regular semesters and 03 supplementary terms. Each academic year at the University consists of 2 regular semesters and 1 supplementary term.

Graduation eligibility and recognition are governed by the Regulations on Full-time Undergraduate Education under the Credit System of Ho Chi Minh University of Banking.

10. Reference and Benchmark Programmes

During the development and review of the Bachelor's Programme in Data Science, Ho Chi Minh University of Banking refers to and benchmarks the programme against selected domestic and international programmes in similar fields. The benchmarking results are used as a reference for reviewing the structure of knowledge areas, programme size, and training orientation, while ensuring alignment with the programme objectives, programme learning outcomes, and the specific characteristics of Ho Chi Minh University of Banking.

The benchmarking data are inherited from programme development documents and previous programme review and update cycles, based on programme documents and information collected at the time the benchmarking activities were conducted.

10.1. Programmes Selected for Reference and Benchmarking

Institution	Country	Reference Programme	Rationale for Selection
National University of Singapore (NUS)	Singapore	Data Science	A programme in the field of Data Science offered by a university with an international teaching and research environment; selected as an international reference programme.
King's College London (KCL)	United Kingdom	Data Science	A programme in the field of Data Science within the context of UK higher education; used as a reference for programme structure and curriculum content.
National Economics University (NEU)	Vietnam	Data Science	A domestic programme in a similar field and closely related to the economics and business context; suitable for benchmarking within the context of Vietnamese higher education.

The selection of these programmes provides reference points from both international and domestic contexts. NUS and KCL offer perspectives from international higher education systems, while NEU provides a benchmarking reference within the context of Data Science education linked to economics and business in Vietnam.

10.2. Benchmarking Results for Programme Structure

a. Benchmarking against International Programmes

BENCHMARKING TABLE OF DATA SCIENCE PROGRAMMES

Knowledge block		Ho Chi Minh University of Banking			KCL			NUS		
		Credits	Percentage	Courses	Credits	Percentage	Courses	Credits	Percentage	Courses
1	General education	23	18,4	10	66	51	18	53	42	18
2	Disciplinary foundations	51	40,8	19	24	18	6	35	28	11
3	Compulsory disciplinary knowledge	20	16,0	7	28	22	7	29	23	9
4	Specialised knowledge	31	24,8	9	12	9	3	9	7	3
Total		125	100	45	130	100	34	126	100	41

b. Benchmarking against a Domestic Programme

BENCHMARKING TABLE OF DATA SCIENCE PROGRAMMES

Knowledge block		Ho Chi Minh University of Banking			National Economics University		
		Credits	Percentage	Courses	Credits	Percentage	Courses
1	General education	23	18,4	10	54	38,03	15
2	Disciplinary foundations	51	40,8	19	33	23,24	11
3	Compulsory disciplinary knowledge	20	16,0	7	33	23,24	11
4	Specialised knowledge	31	24,8	9	22	15,49	4
Total		125	100	45	142	100	41

Note: The data on the structure of the reference programmes are inherited from benchmarking records used during programme development and previous programme review and update cycles. The data reflect programme information available at the time the benchmarking was conducted and continue to be used as a reference in the current programme update.

11. Teaching Methods and Assessment of Learning Outcomes

11.1. Teaching Methods

The following teaching strategies and methods are used to help students achieve the objectives and learning outcomes of the Data Science programme:

- Lecture: The lecturer presents course material and answers students' questions.
- Interactive lecture: Lecturing is interrupted every 12 to 20 minutes by breaks of approximately two to fifteen minutes for students to engage in learning activities, such as multiple-choice questions, problem-solving, matching exercises, filling gaps in lecture notes, discussing a short case study, think-pair-share activities or small-group discussions.
- Recitation: Students answer questions on subject knowledge and reading comprehension.
- Directed discussion: Classroom discussion follows a more or less structured set of questions posed by the lecturer to guide students towards particular insights or conclusions, or to help them achieve specific learning outcomes.
- Group work/learning: Students complete learning activities or produce an output in small groups of two to six, inside or outside the classroom, under close guidance from the lecturer.
- Inquiry-based or inquiry-guided learning: Students use materials to address a challenge, such as answering a question, conducting an experiment or explaining data.
- Problem-based learning: Groups of students conduct research outside the classroom on unfamiliar problems they have identified, in order to develop solutions or approaches to ambiguous problems or dilemmas presented in a story or real-life situation.

- Project-based learning: Students work individually or in groups to apply course knowledge to produce an output, such as a written or oral report, a process or product design, a research proposal or computer code. This method often incorporates collaborative learning.
- Role plays: Students take roles assigned by the lecturer and improvise within a scenario involving a realistic and problematic social or interpersonal situation.

The above teaching methods support the achievement of specific programme learning outcomes as follows:

Teaching methods		Programme learning outcomes (PLOs) (Mark relevant cells with X)										
		1	2	3	4	5	6	7	8	9	10	11
1	Lecture	x				x	x	x		x	x	x
2	Interactive lecture	x	x	x		x	x	x		x	x	x
3	Recitation	x		x	x			x	x			x
4	Directed discussion	x	x	x	x		x	x	x			
5	Group work/learning			x				x	x	x	x	x
6	Inquiry-based learning			x	x		x	x				x
7	Problem-based learning	x	x					x	x		x	x
8	Project-based learning			x	x				x			x
9	Role plays		x	x	x					x		x

11.2. Assessment of Learning Outcomes

Students' learning outcomes in each course are assessed on a 10-point scale, which is converted into letter grades and a 4-point scale. Conversion between grading scales follows the current Regulations on the Organisation and Management of Undergraduate Education at Ho Chi Minh University of Banking.

12. Programme Structure and Content

12.1. Programme Structure

No.	Knowledge block	Number of courses			Number of credits			Percentage
		Compulsory	Elective		Compulsory	Elective		
			Compulsory	Free choice			Compulsory	
1	General education	10	0	0	23	0	0	18,4%
2	Professional education	31	4	10	84	18	36	81,6%
2.1	Disciplinary foundations	18	1	2	48	3	6	40,8%
2.2	Disciplinary knowledge	6	1	2	17	3	6	16%
2.3	Specialisation	7	2	6	19	12	24	24,8%
	Total	41	4	10	107	18	36	100%

No.	Other knowledge blocks	Credits / periods
1	Physical Education	5 credits
2	National Defence and Security Education Programmes	165 periods

12.2. Curriculum Framework

No.	Course code	Course title	Number of credits	Credit allocation			Prior course code	Semester
				Theory	Practice	Other		
	GENERAL EDUCATION KNOWLEDGE BLOCK							
		Compulsory courses						
1	MES302	Microeconomics	3	3	0	0	-	1
2	MES303	Macroeconomics	3	3	0	0	-	1
3	LAW798	Law and Institution	2	2	0	0	-	1
4	MLM306	Marxist – Leninist Philosophy	3	3	0	0	-	1
5	MAE701	Mathematics for Economics 1	2	2	0	0	-	1
6	MAE702	Mathematics for Economics 2	2	2	0	0	-	1
7	MLM303	Ho Chi Minh’s Ideology	2	2	0	0	MLM306	2
8	MLM307	Marxist Leninist Political Economics	2	2	0	0	MLM306	2
9	MLM308	Scientific Socialism	2	2	0	0	MLM306	2
10	MLM309	History of Vietnamese Communist Party	2	2	0	0	MLM306	2
		Total	23					
		Elective courses						
	PROFESSIONAL EDUCATION KNOWLEDGE BLOCK							
	Disciplinary foundation courses							
		Compulsory courses						
11	DAT724	Quantitative Models in Finance	3	3	0	0	ECE301	6
12	DAT726	Foundations of Mathematics for Data Science 1	3	3	0	0	MAE701	2
13	DAT727	Foundations of Mathematics for Data Science 2	3	3	0	0	DAT726	3
14	DIM706	Digital Marketing	3	3	0	0	-	6
15	ECE301	Econometrics	3	3	0	0	AMA303	4

No.	Course code	Course title	Number of credits	Credit allocation			Prior course code	Semester
				Theory	Practice	Other		
16	BAF736	Money, Banking and Fintech	3	3	0	0	-	5
17	AMA303	Probability Theory and Mathematical Statistics	3	3	0	0	-	3
18	ACC301	Principles of Accounting	3	3	0	0	-	5
19	ITS723	Applied Logic in Business	2	2	0	0	-	3
20	INE704	Research Methods	3	2	0	1	-	4
21	DAT729	Numerical Methods	2	2	0	0	MAE701, MAE702	4
22	DAT716	Optimization Methods in Economics	2	2	0	0	MAE701, MAE702	6
23	MAG322	Fundamental of Management	3	3	0	0	-	3
24	FIN303	Corporate Finance	3	3	0	0	ACC301	6
25	DAT719	Bayesian Statistics	2	2	0	0	ECE301	5
26	ENL701	English for Specific Purpose 1	2	2	0	0	TOEIC 350 / IELTS 3.5 / Level 2 of the Six-level Foreign Language Proficiency Framework / Pass the English placement test	3
27	ITS772	Digital Capabilities Development	3	3	0	0	Advanced IT Application Certificate, AI Application Certificate	2
28	ENP762	English for Data Science	2	2	0	0	ENL701	4
		Elective courses (choose 1 of 2 courses)	3					
29	ITS709	Computer Network and Communication	3	3	0	0	-	4
30	ITS711	Business Analysis	3	3	0	0	MAG322	4
		Total	51					
	Disciplinary courses							
		Compulsory courses						
31	ITS314	Data Structures and Algorithms	3	3	0	0	ITS326	4
32	ITS302	Database Systems	3	3	0	0	-	4
33	ITS304	Management Information Systems	3	3	0	0	MAG322	5

No.	Course code	Course title	Number of credits	Credit allocation			Prior course code	Semester
				Theory	Practice	Other		
34	DAT708	Python for Data Analysis	3	3	0	0	-	2
35	ITS326	Object-Oriented Programming	3	3	0	0	DAT708	3
36	FIN730	Sustainable Development and Green Finance	2	2	0	0	-	5
		Elective courses (choose 1 of 2 courses)	3					
37	DAT713	Data Visualization	3	3	0	0	DAT708	5
38	ITB303	E-Commerce	3	3	0	0	-	5
		Total	20					
	Specialisation courses							
		Compulsory courses						
39	DAT731	Blockchain	2	2	0	0	-	6
40	DAT704	Machine Learning	3	3	0	0	DAT708	5
41	DAT722	Data Science for Business	3	3	0	0	DAT704	6
42	DAT728	Advanced Data Science for Business	2	2	0	0	DAT722	7
43	DAT712	Big Data Analysis	3	3	0	0	DAT704	7
44	AIN701	Artificial Intelligence	3	3	0	0	DAT704	7
45	INT702	Data Science Internship	3	0	0	3	Under the University's academic regulations	7
		Elective courses (choose 1 of 2 courses)	3					
46	ITS704	Enterprise Resource Planning Systems	3	3	0	0	ITS304	6
47	ITS718	Data Warehouse and Decision Support Systems	3	3	0	0	ITS302	6
	Elective courses (students choose either the Graduation Thesis or the alternative courses. Students undertaking the Graduation Thesis must meet the eligibility requirements under the University's regulations).							
48	REP702	Graduation Thesis in Data Science	9	0	0	9	Under the University's academic regulations	8
49	DAT709	Data Analysis for Finance	3	3	0	0	DAT704	8
50	BIN701	Business Intelligence	3	3	0	0	DAT704	8

No.	Course code	Course title	Number of credits	Credit allocation			Prior course code	Semester
				Theory	Practice	Other		
51	DAT730	Information Security for Business	3	3	0	0	-	8
		Total	31					
Total programme credits			125					
Total compulsory credits			107					
Minimum elective credits			18					

Notes (if any)

13. Semester-by-Semester Study Plan

Semester	No.	Course code	Course title	Number of credits	Prior course code	Compulsory (C) / Elective (E)	Language of instruction
1	1	MES302	Microeconomics	3	-	C	Vietnamese
	2	MES303	Macroeconomics	3	-	C	Vietnamese
	3	MAE701	Mathematics for Economics 1	2	-	C	Vietnamese
	4	MAE702	Mathematics for Economics 2	2	-	C	Vietnamese
	5	MLM306	Marxist – Leninist Philosophy	3	-	C	Vietnamese
	6	LAW798	Law and Institution	2	-	C	Vietnamese
	7	GYM301	Physical Education 1	1	-	C	Vietnamese
	8		Military Education	8	-	C	Vietnamese
		Total semester credits (excluding National Defence and Security Education and Physical Education 1)		15			
2	1	MLM307	Marxist Leninist Political Economics	2	MLM306	C	Vietnamese
	2	MLM308	Scientific Socialism	2	MLM306	C	Vietnamese
	3	MLM309	History of Vietnamese Communist Party	2	MLM306	C	Vietnamese
	4	MLM303	Ho Chi Minh's Ideology	2	MLM306	C	Vietnamese
	5	DAT726	Foundations of Mathematics for Data Science 1	3	MAE701	C	Vietnamese

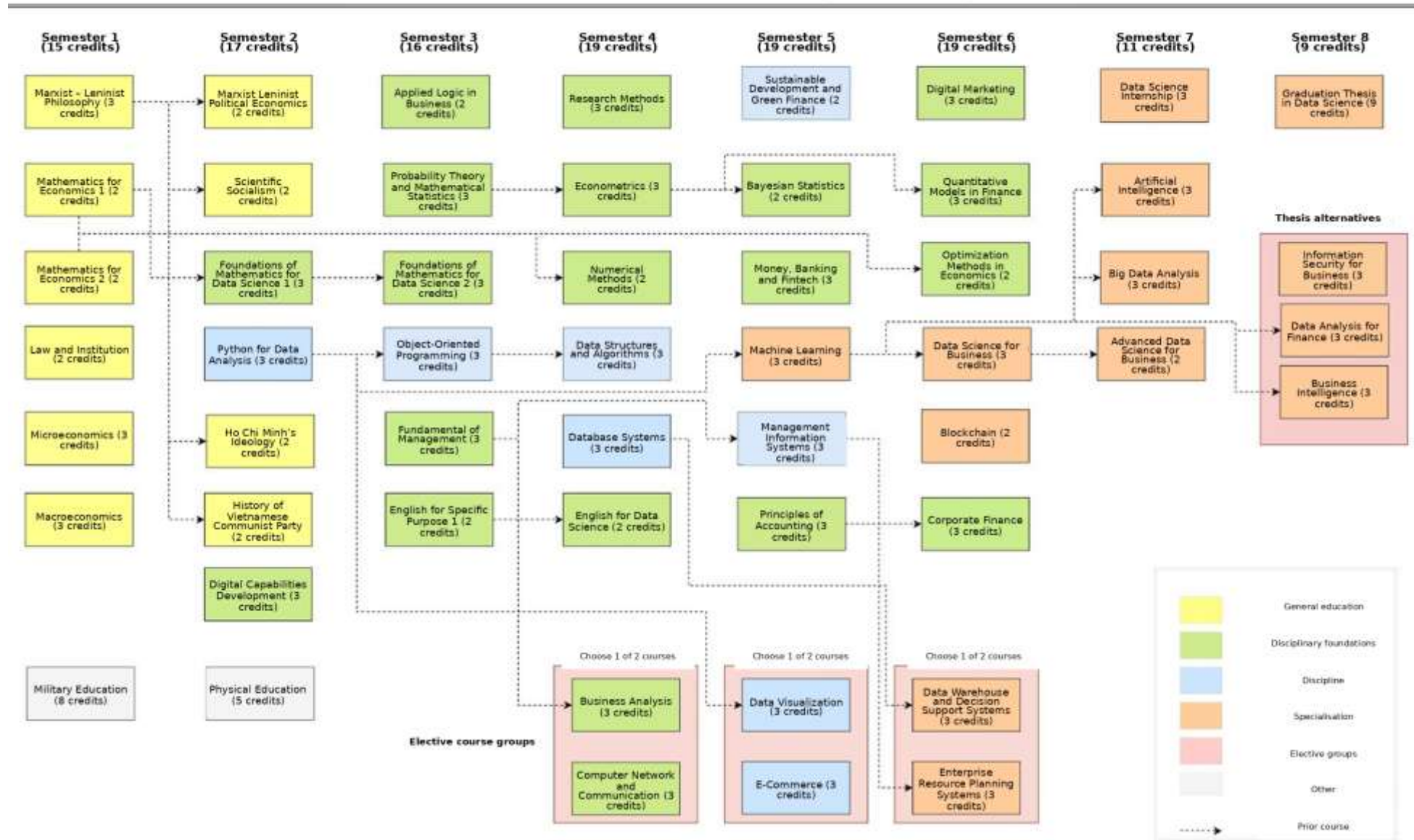
Semester	No.	Course code	Course title	Number of credits	Prior course code	Compulsory (C) / Elective (E)	Language of instruction
	6	ITS772	Digital Capabilities Development	3	Advanced IT Application Certificate, AI Application Certificate	C	Vietnamese
	7	DAT708	Python for Data Analysis	3	-	C	Vietnamese
	8	GYM302	Physical Education 2	1	-	C	Vietnamese
		Total semester credits (excluding Physical Education 2)		17			
3	1	DAT727	Foundations of Mathematics for Data Science 2	3	DAT726	C	Vietnamese
	2	AMA303	Probability Theory and Mathematical Statistics	3	-	C	Vietnamese
	3	ITS723	Applied Logic in Business	2	-	C	Vietnamese
	4	MAG322	Fundamental of Management	3	-	C	Vietnamese
	5	ENL701	English for Specific Purpose 1	2	-	C	English
	6	ITS326	Object-Oriented Programming	3	DAT708	C	Vietnamese
	7	GYM303	Physical Education 3	1	-	C	Vietnamese
		Total semester credits (excluding Physical Education 3)		16			
4	1	ECE301	Econometrics	3	AMA303	C	Vietnamese
	2	INE704	Research Methods	3	-	C	Vietnamese
	3	DAT729	Numerical Methods	2	MAE701, MAE702	C	Vietnamese
	4	ITS314	Data Structures and Algorithms	3	ITS326	C	Vietnamese
	5	ITS302	Database Systems	3	-	C	Vietnamese
	6	ENP762	English for Data Science	2	ENL701	C	English
	7	GYM304	Physical Education 4	1	-	C	Vietnamese
			Elective (1 course) (choose 1 of 2 courses)	3			
	8	ITS711	Business Analysis	3	MAG322	E	Vietnamese
	9	ITS709	Computer Network and Communication	3	-	E	Vietnamese
		Total semester credits (excluding Physical Education 4)		19			

Semester	No.	Course code	Course title	Number of credits	Prior course code	Compulsory (C) / Elective (E)	Language of instruction
5	1	BAF736	Money, Banking and Fintech	3	-	C	Vietnamese
	2	ACC301	Principles of Accounting	3	-	C	Vietnamese
	3	ITS304	Management Information Systems	3	MAG322	C	Vietnamese
	4	DAT719	Bayesian Statistics	2	ECE301	C	Vietnamese
	5	FIN730	Sustainable Development and Green Finance	2	-	C	Vietnamese
	6	DAT704	Machine Learning	3	DAT708	C	Vietnamese
	7	GYM305	Physical Education 5	1	-	C	Vietnamese
			Elective (1 course) (choose 1 of 2 courses)	3			
	8	DAT713	Data Visualization	3	DAT708	E	Vietnamese
	9	ITB303	E-Commerce	3	-	E	Vietnamese
	Total semester credits (excluding Physical Education 5)			19			
6	1	DAT724	Quantitative Models in Finance	3	ECE301	C	Vietnamese
	2	DAT716	Optimization Methods in Economics	2	MAE701, MAE702	C	Vietnamese
	3	FIN303	Corporate Finance	3	ACC301	C	Vietnamese
	4	DIM706	Digital Marketing	3	-	C	Vietnamese
	5	DAT731	Blockchain	2	-	C	Vietnamese
	6	DAT722	Data Science for Business	3	DAT704	C	Vietnamese
			Elective (1 course) (choose 1 of 2 courses)	3			
	7	ITS718	Data Warehouse and Decision Support Systems	3	ITS302	E	Vietnamese
	8	ITS704	Enterprise Resource Planning Systems	3	ITS304	E	Vietnamese
	Total semester credits			19			
7	1	INT702	Data Science Internship	3	Under the University's academic regulations	C	Vietnamese
	2	AIN701	Artificial Intelligence	3	DAT704	C	Vietnamese

Semester	No.	Course code	Course title	Number of credits	Prior course code	Compulsory (C) / Elective (E)	Language of instruction
	3	DAT712	Big Data Analysis	3	DAT704	C	Vietnamese
	4	DAT728	Advanced Data Science for Business	2	DAT722	C	Vietnamese
		Total semester credits		11			
Elective courses (students choose either the Graduation Thesis or the alternative courses. Students undertaking the Graduation Thesis must meet the eligibility requirements under the University's academic regulations; students taking alternative courses must select the following 03 courses from the thesis alternative group).							
8	1	REP702	Graduation Thesis in Data Science	9	Under the University's academic regulations	E	Vietnamese
	2	DAT709	Data Analysis for Finance	3	DAT704	E	Vietnamese
	3	BIN701	Business Intelligence	3	DAT704	E	Vietnamese
	4	DAT730	Information Security for Business	3	-	E	Vietnamese
		Total semester credits		9			

14. Curriculum Map by Knowledge Block and Course Sequence

COURSE DISTRIBUTION BY SEMESTER (125 CREDITS)



15. Matrices of Course Contributions to Programme Learning Outcomes (PLOs)

15.1. Course–PLO Matrix

No.	Semester	Course code	Course title	Programme learning outcomes (PLOs)										
				PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11
1	1	MES303	Macroeconomics	3	3		2							
2	1	MES302	Microeconomics	3	3		2							
3	1	MAE701	Mathematics for Economics 1	3		3			3					
4	1	MAE702	Mathematics for Economics 2	3		3			3					
5	1	MLM306	Marxist – Leninist Philosophy	2			2	2						
6	1	LAW798	Law and Institution	3		2		2						
7	2	MLM307	Marxist Leninist Political Economics	2			2	2						
8	2	MLM308	Scientific Socialism	2			2	2						
9	2	MLM309	History of Vietnamese Communist Party	2			2	2						
10	2	MLM303	Ho Chi Minh's Ideology	2			2	2						
11	2	DAT726	Foundations of Mathematics for Data Science 1 (*)	3					4					
12	2	ITS772	Digital Capabilities Development							3			4	
13	2	DAT708	Python for Data Analysis (*)						3				4	4
14	3	DAT727	Foundations of Mathematics for Data Science 2	3	4									
15	3	AMA303	Probability Theory and Mathematical Statistics (*)	3					3					
16	3	ITS723	Applied Logic in Business	2	3				3					
17	3	MAG322	Fundamental of Management	2			3	3						
18	3	ENL701	English for Specific Purpose 1		3	3						3		
19	3	ITS326	Object-Oriented Programming						3	4			3	
20	4	ITS709	Computer Network and Communication						3	4				
21	4	ECE301	Econometrics	2		3			3					
22	4	ITS711	Business Analysis						3	3				
23	4	INE704	Research Methods	3	4		4							
24	4	DAT729	Numerical Methods	2		3			3					
25	4	ITS314	Data Structures and Algorithms (*)			2			3					3
26	4	ITS302	Database Systems (*)						2	3			3	
27	4	ENP762	English for Data Science		4	4						4		
28	5	BAF736	Money, Banking and Fintech			2			3		4			

No.	Semester	Course code	Course title	Programme learning outcomes (PLOs)										
				PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11
29	5	ACC301	Principles of Accounting	3		2			3					
30	5	ITS304	Management Information Systems	2					2		2			
31	5	DAT719	Bayesian Statistics				4						3	4
32	5	FIN730	Sustainable Development and Green Finance	2		2		2						
33	5	ITB303	E-Commerce					3	3					
34	5	DAT713	Data Visualization	3					4					
35	5	DAT704	Machine Learning (*)						3					3
36	6	DAT724	Quantitative Models in Finance	2										4
37	6	DAT716	Optimization Methods in Economics	2	3									
38	6	FIN303	Corporate Finance		2				3					
39	6	DIM706	Digital Marketing							2	3			3
40	6	DAT731	Blockchain (*)	2				4	3					
41	6	ITS704	Enterprise Resource Planning Systems						3	3	2			
42	6	ITS718	Data Warehouse and Decision Support Systems						4		3		3	
43	6	DAT722	Data Science for Business (*)						4	4				4
44	7	DAT728	Advanced Data Science for Business			3			3					4
45	7	DAT712	Big Data Analysis (*)						4	4				4
46	7	INT702	Data Science Internship				4		4		4			
47	7	AIN701	Artificial Intelligence (*)						3	4				3
48	8	REP702	Graduation Thesis in Data Science						4	4				4
49	8	DAT709	Data Analysis for Finance (*)			3			4					4
50	8	BIN701	Business Intelligence (*)	3					3					4
51	8	DAT730	Information Security for Business (*)	3					4		4			
Number of courses by contribution level														
			Level 1	0	0	0	0	0	0	0	0	0	0	0
			Level 2	14	1	5	7	7	2	1	2	0	0	0
			Level 3	13	5	7	1	2	21	4	2	1	4	4
			Level 4	0	3	1	3	1	9	6	3	1	2	9
			Contributing courses	27	9	13	11	10	32	11	7	2	6	13

15.2. Course–PLO.PI Matrix

No.	Semester	Course code	Course title	Programme learning outcomes (PLOs)																							
				PLO1		PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11			
				PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1		8.2	10.1	10.2	11.1	11.2	11.3
1	1	MES303	Macroeconomics			3		3			2																
2	1	MES302	Microeconomics			3	3				2																
3	1	MAE701	Mathematics for Economics 1		3	3			3	3						3	3										
4	1	MAE702	Mathematics for Economics 2		3	3			3	3						3	3										
5	1	MLM306	Marxist – Leninist Philosophy		2						2	2	2	2													
6	1	LAW798	Law and Institution		3				2				2														
7	2	MLM307	Marxist Leninist Political Economics		2						2	2	2	2													
8	2	MLM308	Scientific Socialism		2						2	2	2	2													
9	2	MLM309	History of Vietnamese Communist Party		2						2	2	2	2													
10	2	MLM303	Ho Chi Minh's Ideology		2						2	2	2	2													
11	2	DAT726	Foundations of Mathematics for Data Science 1 (*)		3	3										4	4										
12	2	ITS772	Digital Capabilities Development																3					3	4		
13	2	DAT708	Python for Data Analysis (*)													3	3							3	4	4	4
14	3	DAT727	Foundations of Mathematics for Data Science 2		3	3	4	4																			
15	3	AMA303	Probability Theory and Mathematical Statistics (*)		3	3										3	3										
16	3	ITS723	Applied Logic in Business			2	3									3											
17	3	MAG322	Fundamental of Management		2							3		3													
18	3	ENL701	English for Specific Purpose 1				3		3											3							
19	3	ITS326	Object-Oriented Programming														3		4						3		
20	4	ITS709	Computer Network and Communication													3		4									
21	4	ECE301	Econometrics			2			3							3											
22	4	ITS711	Business Analysis													2	3	3	3								
23	4	INE704	Research Methods			3	4				4																
24	4	DAT729	Numerical Methods			2			3							3											
25	4	ITS314	Data Structures and Algorithms (*)						2	2						3	3								3	3	
26	4	ITS302	Database Systems (*)													2			3					3			
27	4	ENP762	English for Data Science				4		4												4						
28	5	BAF736	Money, Banking and Fintech						2							3				4							
29	5	ACC301	Principles of Accounting		3	3			2							3											

No.	Semester	Course code	Course title	Programme learning outcomes (PLOs)																									
				PLO1		PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11					
				PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1		8.2	10.1	10.2	11.1	11.2	11.3		
30	5	ITS304	Management Information Systems		2	2										2				2	2								
31	5	DAT719	Bayesian Statistics									4											3		4				
32	5	FIN730	Sustainable Development and Green Finance		2				2						2														
33	5	ITB303	E-Commerce										3	3		3	3												
34	5	DAT713	Data Visualization		3	3										4	4												
35	5	DAT704	Machine Learning (*)													3	3								3	3			
36	6	DAT724	Quantitative Models in Finance		2	2																			4	4			
37	6	DAT716	Optimization Methods in Economics		2		3																						
38	6	FIN303	Corporate Finance					2								3													
39	6	DIM706	Digital Marketing															2	2	3					3	3			
40	6	DAT731	Blockchain (*)		2	2								4	4		3	2											
41	6	ITS704	Enterprise Resource Planning Systems													2	3	3	3	2									
42	6	ITS718	Data Warehouse and Decision Support Systems													4				3				3					
43	6	DAT722	Data Science for Business (*)													4	4	4	4							4	4		
44	7	DAT728	Advanced Data Science for Business						3	3						3	3								4	4			
45	7	DAT712	Big Data Analysis (*)													4	4	4	4							4	4		
46	7	INT702	Data Science Internship									4	4			4	4			4	4								
47	7	AIN701	Artificial Intelligence (*)													3	3	4	4						3	3			
48	8	REP702	Graduation Thesis in Data Science													4	4	4	4						4	4	4		
49	8	DAT709	Data Analysis for Finance (*)						3	3						4	4								4	4			
50	8	BIN701	Business Intelligence (*)		3	3										3	3								4	4	4		
51	8	DAT730	Information Security for Business (*)		3	3										4	4			4	4								
Number of courses by contribution level																													
			Level 1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			Level 2		11	6	0	1	5	1	7	5	6	5	1	4	1	1	1	2	1	0	0	0	0	0	0		
			Level 3		10	12	4	1	7	4	0	1	1	2	0	18	13	2	4	2	0	1	4	2	4	4	0		
			Level 4		0	0	3	1	1	0	2	2	1	1	0	9	8	5	5	3	2	1	0	2	7	8	4		
Contributing courses																													
		Courses assessing PIs			21	18	7	3	13	5	9	8	8	8	1	31	22	8	10	7	3	2	4	4	11	12	4		
		Courses assessing PLOs			27		9		13		11		10			32		11		7		2	6		13				

15.3. Course–CLO.PLO.PI Matrix

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																								
						PLO1			PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO 9	PLO10		PLO11		
					CLOi	PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2		10.1	10.2	11.1	11.2	11.3
1	1	MES303	Macroeconomics	CLO1			3																						
				CLO2					3																				
				CLO3								2																	
			Summary						3		3			2															
2	1	MES302	Microeconomics	CLO1			3																						
				CLO2					3																				
				CLO3								2																	
			Summary						3		3			2															
3	1	MAE701	Mathematics for Economics 1	CLO1		3	3																						
				CLO2		3	3																						
				CLO3		3	3																						
				CLO4													3	3											
				CLO5		3	3			3	3																		
			Summary						3				3					3											
4	1	MAE702	Mathematics for Economics 2	CLO1		3	3																						
				CLO2		3	3																						
				CLO3													3	3											
				CLO4						3	3																		
			Summary						3				3					3											
5	1	MLM306	Marxist – Leninist Philosophy	CLO1		2																							
				CLO2		2																							
				CLO3								2	2																
				CLO4										2	2														
			Summary						2						2		2												
6	1	LAW798	Law and Institution	CLO1		3																							
				CLO2						2																			
				CLO3										2															
			Summary						3				2			2													

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																								
						PLO1		PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11			
					PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2		10.1	10.2	11.1	11.2	11.3	
7	2	MLM307	Marxist Leninist Political Economics	CLO1		2																							
				CLO2		2																							
				CLO3								2	2																
				CLO4										2	2														
			Summary					2						2		2													
8	2	MLM308	Scientific Socialism	CLO1		2																							
				CLO2		2																							
				CLO3								2	2																
				CLO4										2	2														
			Summary					2						2		2													
9	2	MLM309	History of Vietnamese Communist Party	CLO1		2																							
				CLO2		2																							
				CLO3								2	2																
				CLO4										2	2														
			Summary					2						2		2													
10	2	MLM303	Ho Chi Minh's Ideology	CLO1		2																							
				CLO2		2																							
				CLO3								2	2																
				CLO4										2	2														
			Summary					2						2		2													
11	2	DAT726	Foundations of Mathematics for Data Science 1 (*)	CLO1		3	3																						
				CLO2												4	4												
			Summary					3										4											
12	2	ITS772	Digital Capabilities Development	CLO1																3									
				CLO2																				4					
				CLO3																3									
				CLO4																			3						
			Summary															3					4						
13	2	DAT708	Python for Data Analysis (*)	CLO1													3	3											
				CLO2																				4	4				
				CLO3																			3	4					
			Summary														3						4	4					

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																								
						PLO1		PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11			
					CLOi	PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1		8.2	10.1	10.2	11.1	11.2	11.3
14	3	DAT727	Foundations of Mathematics for Data Science 2	CLO1		3	3																						
			CLO2				4	4																					
			Summary					3	4																				
15	3	AMA303	Probability Theory and Mathematical Statistics (*)	CLO1		2	2																						
				CLO2		3	3																						
				CLO3												3	3												
			Summary					3								3													
16	3	ITS723	Applied Logic in Business	CLO1			2																						
				CLO2				3																					
				CLO3												3													
			Summary					2	3						3														
17	3	MAG322	Fundamental of Management	CLO1		2																							
				CLO2										3															
				CLO3								3																	
			Summary					2					3		3														
18	3	ENL701	English for Specific Purpose 1	CLO1				3																					
				CLO2					3																				
				CLO3																		3							
			Summary							3	3										3								
19	3	ITS326	Object-Oriented Programming	CLO1																				3					
				CLO2												3													
				CLO3														4											
			Summary													3	4				3								
20	4	ITS709	Computer Network and Communication	CLO1													2												
				CLO2												3													
				CLO3														4											
				CLO4													4												
			Summary													3	4												
21	4	ECE301	Econometrics	CLO1			2																						
				CLO2												3													
				CLO3												3													
				CLO4					3																				
			Summary					2			3						3												

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																								
						PLO1			PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO 9	PLO10		PLO11		
					PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	10.1		10.2	11.1	11.2	11.3	
22	4	ITS711	Business Analysis	CLO1													2												
				CLO2													3												
				CLO3															3	3									
			Summary														3		3										
23	4	INE704	Research Methods	CLO1		3																							
				CLO2		4																							
				CLO3							4																		
			Summary					3		4					4														
24	4	DAT729	Numerical Methods	CLO1		2																							
				CLO2		2																							
				CLO3						3						3													
			Summary					2		3						3													
25	4	ITS314	Data Structures and Algorithms (*)	CLO1												3	3												
				CLO2												3	3												
				CLO3																					3	3			
				CLO4						2	2																		
			Summary								2						3									3			
26	4	ITS302	Database Systems (*)	CLO1												2													
				CLO2															3										
				CLO3																				3					
			Summary														2		3					3					
27	4	ENP762	English for Data Science	CLO1			4																						
				CLO2						4																			
				CLO3																			4						
			Summary					4			4											4							
28	5	BAF736	Money, Banking and Fintech	CLO1						2																			
				CLO2												3													
				CLO3																4									
			Summary								2						3		4										

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																							
						PLO1		PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11		
					PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2		10.1	10.2	11.1	11.2	11.3
29	5	ACC301	Principles of Accounting	CLO1		3																						
				CLO2			3																					
				CLO3												3												
				CLO4						2																		
				CLO5												3												
			Summary						3				2						3									
30	5	ITS304	Management Information Systems	CLO1		2	2																					
				CLO2		2	2																					
				CLO3												2												
				CLO4																2	2							
			Summary						2									2			2							
31	5	DAT719	Bayesian Statistics	CLO1																					2			
				CLO2																					4			
				CLO3									4															
				CLO4																			3					
			Summary											4										3		4		
32	5	FIN730	Sustainable Development and Green Finance	CLO1		2																						
				CLO2						2																		
				CLO3												2												
			Summary						2				2			2												
33	5	ITB303	E-Commerce	CLO1													2	2										
				CLO2													3	3										
				CLO3													3	3										
				CLO4										3	3													
			Summary												3		3		3									
34	5	DAT713	Data Visualization	CLO1		3	3																					
				CLO2													4	4										
			Summary						3									4										
35	5	DAT704	Machine Learning (*)	CLO1													2	2										
				CLO2																				3	3			
				CLO3													3	3										
			Summary														3							3				

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																								
						PLO1		PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11			
					PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2		10.1	10.2	11.1	11.2	11.3	
36	6	DAT724	Quantitative Models in Finance	CLO1		2	2																						
				CLO2																						2	2		
				CLO3																						4	4		
			Summary					2																			4		
37	6	DAT716	Optimization Methods in Economics	CLO1		2																							
				CLO2				3																					
			Summary					2		3																			
38	6	FIN303	Corporate Finance	CLO1					2																				
				CLO2												3													
			Summary							2						3													
39	6	DIM706	Digital Marketing	CLO1																2									
				CLO2																2									
				CLO3																	3								
				CLO4																					3				
				CLO5																						3			
			Summary													3		2		3					3				
40	6	DAT731	Blockchain (*)	CLO1		2	2																						
				CLO2												3	2												
				CLO3										4	4														
			Summary					2						4		3													
41	6	ITS704	Enterprise Resource Planning Systems	CLO1													2												
				CLO2													3												
				CLO3														3	3										
				CLO4																2									
			Summary													3		3		2									
42	6	ITS718	Data Warehouse and Decision Support Systems	CLO1																2									
				CLO2																3									
				CLO3													4												
				CLO4													4												
				CLO5																				3					
				CLO6																				2					
			Summary													4		3					3						

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																								
						PLO1			PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11		
					PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	10.1		10.2	11.1	11.2	11.3	
43	6	DAT722	Data Science for Business (*)	CLO1													4	4											
			CLO2														4	4											
			CLO3																							4	4		
			Summary													4		4							4				
44	7	DAT728	Advanced Data Science for Business	CLO1						3	3																		
			CLO2					3	3																				
			CLO3												3	3													
			CLO4																					4	4				
			CLO5												3	3													
			Summary						3						3										4				
45	7	DAT712	Big Data Analysis (*)	CLO1												4	4												
			CLO2														4	4											
			CLO3																					4	4				
			Summary												4		4							4					
46	7	INT702	Data Science Internship	CLO1								4	4																
			CLO2											4	4														
			CLO3																4	4									
			Summary									4			4			4											
47	7	AIN701	Artificial Intelligence (*)	CLO1												3	3												
			CLO2															4	4										
			CLO3																					3	3				
			Summary												3		4							3					
48	8	REP702	Graduation Thesis in Data Science	CLO1												4	4												
			CLO2														4	4											
			CLO3																					4	4	4			
			Summary												4		4							4					
49	8	DAT709	Data Analysis for Finance (*)	CLO1						3	3																		
			CLO2												3	3													
			CLO3												4	4													
			CLO4																					4	4				
			CLO5												4	4													
			Summary						3						4										4				

No.	Semester	Course code	Course title (HPi)		Programme learning outcomes (PLOs)																							
						PLO1		PLO2		PLO3		PLO4		PLO5			PLO6		PLO7		PLO8		PLO9	PLO10		PLO11		
					CLOi	PI	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1		8.2	10.1	10.2	11.1	11.2
50	8	BIN701	Business Intelligence (*)	CLO1		3	3																					
				CLO2																					4	4	4	
				CLO3												3	3											
				CLO4												3	3											
			Summary					3										3									4	
51	8	DAT730	Information Security for Business (*)	CLO1		3	3																					
				CLO2												4	4											
				CLO3																4	4							
			Summary					3										4						4				
Number of courses by contribution level																												
			Level 1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
			Level 2			11	6	0	1	5	1	7	5	6	5	1	4	1	1	1	2	1	0	0	0	0		
			Level 3			10	12	4	1	7	4	0	1	1	2	0	18	13	2	4	2	0	1	4	2	4		
			Level 4			0	0	3	1	1	0	2	2	1	1	0	9	8	5	5	3	2	1	0	2	7		
Contributing courses																												
		Courses assessing PIs				21	18	7	3	13	5	9	8	8	8	1	31	22	8	10	7	3	2	4	4	11		
		Courses assessing PLOs				27		9		13		11		10			32		11		7		2	6		13		

16. Course Descriptions

No.	Course code	Course title	Description
1	MES302	Microeconomics	This course provides fundamental knowledge of the ten principles of economics, supply and demand theories, market structures, and theories of consumer and firm behaviour.
2	MES303	Macroeconomics	This course provides fundamental knowledge of macroeconomics, including an overview of macroeconomics, macroeconomic data, production and growth, the monetary system, aggregate demand and aggregate supply, monetary and fiscal policy, inflation and unemployment, and open-economy macroeconomics.
3	MAE701	Mathematics for Economics 1	Mathematics for Economics 1 is part of the general education knowledge block. It introduces the fundamental mathematical tools and methods of linear algebra used in economic analysis. Topics include matrices, systems of linear equations, vector spaces and applications in economics. The course develops students' logical thinking and their ability to use mathematical tools to solve practical economic problems.
4	MAE702	Mathematics for Economics 2	Mathematics for Economics 2 is part of the general education knowledge block. It introduces the fundamental mathematical tools and methods of calculus used in economic analysis. Topics include limits, continuity, derivatives, differentials and integrals of functions of one variable; partial derivatives, total differentials and extrema of multivariable functions; and applications in economics. The course develops students' logical thinking and their ability to use mathematical tools to solve practical economic problems.
5	MLM306	Marxist – Leninist Philosophy	This course provides general knowledge to equip students with a scientific materialist worldview and a dialectical materialist methodology. It helps students understand the role and position of Marxist–Leninist philosophy in social life, strengthen their political conviction, progressively develop positive cultural and human values, and reinforce their ideals and confidence in national construction and development. It thereby enhances their sense of social responsibility in employment and life after graduation.
6	LAW798	Law and Institution	Law and Institution is a compulsory general education course introducing fundamental theoretical issues concerning law and institutions. Students acquire basic knowledge of institutions, including their concepts and constituent elements. They apply this knowledge to interpret legal institutions in relation to the origins, nature, functions and forms of law; law-making bodies; and mechanisms of legal regulation in relation to the recognition and effective protection of human rights. Students learn to choose conduct consistent with legal requirements and community responsibility, and develop respect for the law and a commitment to establishing and protecting justice.
7	MLM307	Marxist Leninist Political Economics	Marxist Leninist Political Economics is an economic science and a constituent part of Marxism–Leninism. It examines human social relations in the production, exchange and consumption of material wealth across stages of social development. It clarifies the nature of economic processes and phenomena and identifies the laws governing socio-economic development.
8	MLM308	Scientific Socialism	Scientific Socialism is one of the three constituent parts of Marxism–Leninism. It examines the necessary laws underlying the emergence of the communist socio-economic formation and the regularities of political and social issues in the socialist revolutionary process worldwide and in contemporary Vietnam.
9	MLM309	History of Vietnamese Communist Party	This course provides basic knowledge of the founding of the Communist Party of Vietnam; its leadership of the revolution at different stages; and the achievements, limitations and lessons of its leadership. It aims to enhance students' understanding of and confidence in the Party and their ability to apply the knowledge acquired in practice, contributing to the construction and defence of the Socialist Republic of Vietnam.

No.	Course code	Course title	Description
10	MLM303	Ho Chi Minh's Ideology	This course provides core knowledge of the formation and development of Ho Chi Minh's ideology; national independence and socialism; the Communist Party and the State of Vietnam; national unity and international solidarity; culture, ethics and human development; and the Party's application of these ideas in the Vietnamese revolution. It helps students understand the practical role and value of Ho Chi Minh's ideology.
11	DAT726	Foundations of Mathematics for Data Science 1	Foundations of Mathematics for Data Science 1 extends linear algebra (Mathematics for Economics 1). It equips students with advanced concepts and methods encountered in the Data Science programme. Topics include vector spaces, linear mappings, kernels and images, quotient spaces, linear and bilinear forms, matrices of linear mappings and bilinear forms, linear operators, Euclidean spaces, real quadratic forms and matrix calculus.
12	ITS772	Digital Capabilities Development	This course equips students across the disciplines at Ho Chi Minh University of Banking with the knowledge and skills needed to live, learn, work and communicate actively, positively and safely in digital environments. Students acquire basic knowledge of using data and establishing a presence in digital environments, together with skills in using digital platforms, software and devices in daily life, study and future professional activities.
13	DAT708	Python for Data Analysis	This course equips students with knowledge of Python programming for data analysis. Topics include programming fundamentals, control structures, simple and complex data structures, functions, files and object-oriented programming. Selected Python libraries commonly used in data science are also introduced. Python is used for both teaching and practical work.
14	DAT727	Foundations of Mathematics for Data Science 2	This course introduces fundamental logic, including propositions, predicates, quantifiers and logical inference; advanced combinatorics, including combinations with and without repetition; relations, including equivalence and order relations; and graph theory, including basic concepts and graph algorithms.
15	AMA303	Probability Theory and Mathematical Statistics	This course equips students with probability and statistics theory as a basis for disciplinary foundation and specialisation courses. It introduces the application of course knowledge in economics, finance and banking, management, management information systems and data science.
16	ITS723	Applied Logic in Business	This course equips students with knowledge of the mathematical foundations of computer science and cryptography. Students apply this knowledge to improve their reasoning and communication skills and to support learning in other courses in the programme.
17	MAG322	Fundamental of Management	This course provides fundamental knowledge of management, including its historical development, concepts, role and functions, and the basic skills of managers. Through management case studies, students deepen their understanding of theory and progressively apply their knowledge to solve management problems. The course also introduces current trends in the development of management theories.
18	ENL701	English for Specific Purpose 1	This course introduces terminology, concepts and foundational knowledge used in economics and commerce, together with communication situations and activities relevant to internships and job interviews. It also helps students develop confidence in using English in the context of international integration.
19	ITS326	Object-Oriented Programming	Object-Oriented Programming is a compulsory disciplinary course. It provides an overview of object-oriented programming approaches, principles and tools. Students acquire knowledge of a specific object-oriented programming language to solve practical management problems, such as sales, student grades and payroll management.

No.	Course code	Course title	Description
20	ITS709	Computer Network and Communication	This elective course provides foundational knowledge of computer networks and communications. It introduces key protocols, standards and typical network applications within the OSI and TCP/IP layered models, and the characteristics and components of networks such as LANs, WANs and the Internet. It covers techniques for designing, installing and configuring common applications on local networks and the Internet. Students study and practise the operation of basic TCP/IP layers, administrative commands and network equipment. The course also covers enterprise network administration and modern technologies such as artificial intelligence and machine learning (AI/ML) integrated into intelligent network management solutions. Students apply basic and advanced networking knowledge to install and administer local networks in enterprise information systems and to support subsequent courses in the programme.
21	ECE301	Econometrics	Econometrics is a disciplinary foundation course. It provides basic knowledge of regression analysis, including ordinary least squares estimation, statistical inference and forecasting, model testing and model selection.
22	ITS711	Business Analysis	This course introduces the business analysis profession, the tasks of business analysts, and the fundamental skills, tools and techniques needed to analyse the business systems of an enterprise or organisation. Such analysis enables organisations to improve their business processes and business information systems.
23	INE704	Research Methods	Research Methods is a compulsory course in the foundation knowledge block for the group of disciplines. It introduces methods for conducting systematic and scientific research. Topics include research problems and the role of research; identifying a research problem; reviewing relevant literature and previous studies; formulating research questions; research ethics, citation and referencing; data collection and sampling; data presentation and the selection of research designs for different types of data; and writing research proposals and reports.
24	DAT729	Numerical Methods	This course provides knowledge of numerical methods. Students learn the concepts and methods of iteration, computer-based methods for solving systems of linear equations, algorithmic thinking and the effective use of tools. They develop the ability to work independently and use matrices, determinants, Python programming and handheld calculators to solve systems of equations and other problems through iterative methods.
25	ITS314	Data Structures and Algorithms	This course provides foundations in data structures and algorithms: array-based and linked lists, stacks and queues; complexity analysis using Big O notation; classical sorting algorithms; hash tables and collision handling; binary search trees and balanced AVL trees; heaps and priority queues; graphs, including representations, BFS/DFS traversal and applications; minimum spanning trees using Kruskal's algorithm; and shortest paths using the Bellman–Ford and Dijkstra algorithms. Emphasis is placed on correctness, complexity analysis and comparison, practical implementation and experimentation.
26	ITS302	Database Systems	This course introduces fundamental database knowledge, with a focus on database construction and querying. Topics include entity–relationship models, relational data models, conversion from entity–relationship models to relational models, functional dependencies and relational normal forms. Students practise using SQL Server to become familiar with data languages and perform data definition, manipulation and querying.
27	ENP762	English for Data Science	This compulsory disciplinary foundation course comprises 4 chapters. It further develops students' knowledge and vocabulary related to Data Science in Business, covering computer architecture, operating systems, business applications of computers, communication networks and computing-related fields. It helps students confidently use data science terminology and sentence structures to read and understand specialist materials in English. In listening and speaking, students develop presentation skills and the ability to use English in a range of common situations.

No.	Course code	Course title	Description
28	BAF736	Money, Banking and Fintech	This disciplinary foundation course first introduces basic knowledge of money and banking: an overview of money and the development of payment systems; financial markets and instruments; commercial banks and their operations; and central banks and monetary policy. It then introduces financial technology, including an overview of FinTech, its impact on traditional banking, the FinTech ecosystem, and enabling technologies such as big data, artificial intelligence, machine learning, blockchain and Open APIs. These topics provide essential foundations for the study of professional techniques in economics, finance and banking, and financial technology. The course helps students understand the development of payment systems, financial markets and traditional banking, central bank monetary policies, and the changes resulting from FinTech development. Students also learn to apply this foundational knowledge in subsequent disciplinary and specialisation courses.
29	ACC301	Principles of Accounting	This course provides basic accounting knowledge, including accounting concepts and objects, accounting methods, books of account, accounting forms and the organisation of accounting work, enabling students to practise enterprise accounting processes in accordance with current legislation. It also equips students to use accounting knowledge to interpret professional issues in economics, including finance, banking, accounting, business administration and international economics.
30	ITS304	Management Information Systems	Management Information Systems is a foundation course in economics and management, taught before specialisation courses. It introduces information systems needed for management and their applications in organisations and businesses. The course presents tools for planning, organising and developing information systems suited to business organisations, with the aim of improving operational efficiency and competitive advantage.
31	DAT719	Bayesian Statistics	Bayesian Statistics is a course in the disciplinary foundation knowledge block. This course introduces prior probability distributions, likelihood functions and posterior probability distributions; Bayesian inference methods, including estimation, highest posterior density intervals, hypothesis testing and regression models. It also provides an overview of simulation methods that support computation in Bayesian inference. The course prepares graduates for roles in managing operations and developing data science in business, and in analysing and advising on business data science solutions.
32	FIN730	Sustainable Development and Green Finance	Sustainable Development and Green Finance provides foundational knowledge of sustainable development and green finance, and the relationships and role of the financial system in achieving sustainable development goals. Topics include climate change and global issues; sustainable development and its relationship with finance; international policies and the United Nations Sustainable Development Goals; and Vietnam's sustainable development policies, strategies and action programmes. Students learn about systems and methods for measuring and monitoring sustainable development goals, and for measuring and reporting the impact, alignment and flows of green finance. The course also introduces the development of green financial products and services, such as green banking, green bonds, responsible investment and sustainable investment, and the roles of government, businesses, individuals and the financial sector in the transition to a green and sustainable economy. Students develop a sense of responsibility for sustainable development and the ability to analyse, evaluate and propose financial solutions that support it in practice.
33	ITB303	E-Commerce	This course equips students with knowledge of e-commerce, including business models, technical infrastructure, electronic marketing methods, electronic payment, security, and the legal, social and ethical environment. Students learn to select and outline appropriate e-commerce business models, and identify and explain the requirements for developing and operating e-commerce websites. They also apply this knowledge in subsequent courses in the programme.

No.	Course code	Course title	Description
34	DAT713	Data Visualization	Data visualisation presents information embedded in data through charts and images to make it easier to understand. This course introduces data and the information it contains, chart types and presentation methods. Students learn to apply data visualisation knowledge and tools in practical activities.
35	DAT704	Machine Learning	This course introduces machine learning for business applications. Topics include supervised learning, covering algorithms that initially require limited optimisation, parametric and non-parametric learning, artificial neural networks and support vector machines; and unsupervised learning, including clustering and dimensionality reduction. The course also discusses and introduces recent applications for further independent study, such as robot control, data mining, autonomous navigation, bioinformatics, speech recognition and text processing.
36	DAT724	Quantitative Models in Finance	This disciplinary foundation course introduces quantitative models used in finance. Students learn to understand and apply quantitative methods to investigate and analyse financial issues.
37	DAT716	Optimization Methods in Economics	This course provides basic knowledge of linear programming theory, the simplex algorithm and the potential method. Duality results are also examined in detail. Students study important problems, including linear programming and transportation problems, and practise solving specific models for each type of problem.
38	FIN303	Corporate Finance	This course provides fundamental knowledge of corporate finance, including an overview of corporate finance, the time value of money, return and risk, the cost of capital, leverage and capital structure theories.
39	DIM706	Digital Marketing	Digital marketing is an essential trend in modern marketing. Building on principles of marketing within the marketing discipline, the course directly addresses digital marketing methods, tools and approaches. It enables students to adopt suitable approaches and responses to technological developments when serving both B2B and B2C customers.
40	DAT731	Blockchain	This course introduces the fundamentals of blockchain technology and its potential applications in financial services, government, banking, contract management, identity management and other areas.
41	ITS704	Enterprise Resource Planning Systems	This course introduces enterprise resource planning systems, including basic concepts, scope of application and business processes within enterprises and organisations. Students develop practical skills using an actual enterprise resource planning system and become familiar with common technologies and implementation approaches.
42	ITS718	Data Warehouse and Decision Support Systems	This course provides foundational knowledge and skills in data warehousing, including design, installation, data integration and data analysis, and in decision support systems, including their components and models. It introduces tools and techniques for developing decision support systems and helps students understand their role and application in business practice.
43	DAT722	Data Science for Business	This course equips students with knowledge of data science applications in finance using Python and tools within the data science ecosystem. Students study and practise data processing, statistical analysis and visualisation with tools such as Matplotlib, NumPy, Numba, Pandas, SciPy, Scikit-Learn and StatsModels, alongside other modern tools updated as data science technologies evolve. Students also study and practise fundamental machine learning algorithms.
44	DAT728	Advanced Data Science for Business	This course introduces data science applications in business using Python and tools within the data science ecosystem. It enables students to apply data science and machine learning to the analysis of business data in areas such as FinTech, asset management and corporate finance.

No.	Course code	Course title	Description
45	DAT712	Big Data Analysis	This course introduces basic and advanced concepts in big data and methods of big data analysis. Topics include organising, storing and processing big data, and techniques for data mining and analysis, such as MapReduce, frequent itemset mining, clustering, dimensionality reduction, recommender systems, social network data analysis and computational marketing. Students also explore in greater depth the big data techniques and algorithms deployed by major technology companies worldwide.
46	INT702	Data Science Internship	The Data Science Internship guides students in visits, surveys, research and practical data science activities at businesses and other organisations. The internship lasts approximately 12 weeks. Students apply their data science knowledge in real business environments to deepen their understanding of theory, develop knowledge and professional skills for their future careers, and contribute relevant suggestions to their host organisations.
47	AIN701	Artificial Intelligence	This course introduces artificial intelligence (AI), its applications in business, AI management and development, associated risks, and current trends and future directions. Students learn to apply AI knowledge to the management, application and development of AI in practice.
48	REP702	Graduation Thesis in Data Science	Students work on a data science topic introduced by their supervisor or proposed by themselves. The Graduation Thesis in Data Science is a scholarly output reflecting students' research in the field. With guidance from their supervisor, students apply the knowledge and methods they have learned to investigate a relevant problem. Note: Students choose either the Graduation Thesis or the alternative courses. Students undertaking the thesis must meet the eligibility requirements under the University's regulations. Students choosing the alternative route must take the 03 courses specified in the programme.
49	DAT709	Data Analysis for Finance	This course introduces advanced analytical techniques for financial data to support business decision-making. Main topics include data preprocessing, the development of advanced analytical models, pattern mining, and the application of these data models to specific business and finance cases. Special types of data are also considered, including text, streaming data, time series and social network data.
50	BIN701	Business Intelligence	This course provides an overview of analytics, including techniques and tools successfully applied in modern organisations. Students explore the evolution of decision support systems (DSS), business intelligence (BI) and business analytics (BA), from standard reporting to integrated information systems that meet the needs of modern decision-makers. They also develop introductory practical skills with decision support tools such as Tableau and Excel Solver.
51	DAT730	Information Security for Business	Information Security for Business is an elective course in the specialisation knowledge block. It introduces information security, its components and principles, and issues such as hackers, viruses and natural disasters. Topics also include intrusion detection systems; encryption principles, methods, models and techniques; risk analysis; and system recovery planning following incidents.

17. Implementation Guidelines

17.1. Online Teaching and Learning

A maximum of 30% of the total programme workload may be delivered through online classes.

17.2. Alternatives to the Graduation Thesis

The courses offered as alternatives to the Graduation Thesis carry an equivalent number of credits and are organised for students who do not meet the eligibility requirements or are unable to undertake the Graduation Thesis under the applicable regulations.

The thesis alternative courses, with an equivalent total number of credits, are:

- Data Analysis for Finance: 03 credits

- Business Intelligence: 03 credits
- Information Security for Business: 03 credits

17.3. Physical Education and National Defence and Security Education

These courses are graduation requirements and are excluded from the cumulative grade point average.

17.4. Information Technology Proficiency Requirements

Information technology proficiency requirements at entry and during study follow the University's current regulations on IT proficiency for undergraduate education.

17.5. Foreign Language Proficiency Requirements

Foreign language proficiency requirements at entry and during study follow the University's current regulations on foreign language proficiency for undergraduate education.

APPROVED BY THE RECTOR

**FACULTY RESPONSIBLE FOR THE PROGRAMME
DEAN**

Prof. Dr. NGUYEN DUC TRUNG

Assoc. Prof. Dr. NGUYEN MINH HAI