![VinUniversity logo]

CURRICULUM FRAMEWORK

BACHELOR OF SCIENCE IN DATA SCIENCE

PROGRAM CODE: **7460108**

Applicable from Cohort 2025-2029 from Academic Year 2025-2026

(Decision No. 474/2025/QĐ-VUNI dated August 15, 2025 by Provost of VinUniversity)

This curriculum framework has been reviewed and validated by Cornell University

Records of changes

Version	Published date	Effective Date	Approved by	Description of changes
1	15/8/2025	15/8/2025	Developed by Curriculum Review Taskforce Reviewed by College Academic Committee; Scientific and Educational Committee Approved by: Provost (Decision No. 474/2025/QĐ-VUNI dated August 15, 2025 by Provost of VinUniversity).	First release for Cohort 2025-2029

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1. PROGRAM OVERVIEW

1.1. Program Profile

Name of the degree	Bachelor of Science in Data Science
Name of the program	
Program Code	7460108
Vietnam Qualifications Framework Level	6
Length of Program	4 years
Mode of Delivery	Full-time
Language of Delivery	English
Total credits	*Single major:* 120 credits
	Major in Data Science + minor in Business Essentials, Finance, Marketing, Communications, Healthcare Management, Healthcare Information for Engineers or other minors: 135 credits
Home College	College of Engineering and Computer Science

1.2. Program Purpose

The purpose of the program is to develop young data scientists with
- *understanding of theoretical principles of computing, statistics and data management to support continual learning,*
- *experience with current data science techniques and producing value from data,*
- *understanding of their role in an organisation and in broader society of managing data and using it productively.*

This will allow them to contribute as practicing Data Scientists demonstrating creativity, innovation, leadership and professionalism.

2. PROGRAM EDUCATIONAL OBJECTIVES AND PROGRAM LEARNING OUTCOMES

2.1. Program Educational Objectives

The educational objectives of the Bachelor of Science in Data Science program are that within a few years of graduation, a majority of our graduates will demonstrate excellence in top graduate programs; or in technical and managerial leadership tracks in technology-based industries or other sectors; or pursuing entrepreneurial ventures. In these roles they will:

PEO1: Demonstrate proficiency with data science principles and knowledge of specific computing or statistical methods, also to serve as a basis for continual learning.

PEO2: Acquire, manage, explore and analyze large or complex data sets in order to provide useful insight, while properly respecting economic, environmental, cultural, life safety, and ethical standards or constraints.

PEO3: Discover and apply new knowledge, and develop new tools for the practice of data science and the development of data processing pipelines.

PEO4: Be sensitive to professional and societal contexts, committed to ethical action, engaged in life-long learning and be prepared for future academic career, should they want one.

PEO5: Be leaders with an entrepreneurial mindset, and effective communicators as members of multidisciplinary teams, both in the profession and in the community.

PEO6: Engage with their communities, profession, the nation, and the world.

2.2. Program Learning Outcomes (Student Outcomes)

After successful completion of the program, students are able to:

PROGRAM LEARNING OUTCOMES (PLOs)	PERFORMANCE INDICATORS (PIs)
PLO 1: Acquire, manage, explore, and analyze large or complex data sets in order to provide insight about specific organizational or science problems.	
PLO 2: Do so using agile development and an entrepreneurial mindset	
PLO 3: Design, implement, evaluate, and maintain a data processing pipeline using standard tools	
PLO 4: Apply appropriate computer science and statistical theory and software development fundamentals when approaching data science problems	
PLO 5: Use visualization and communicate effectively for a variety of professional contexts.	
PLO 6: Recognize professional responsibilities and make informed judgments in data science practice based on legal, ethical, privacy and security considerations.	
PLO 7: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline	

3. CURRICULUM STRUCTURE

3.1. Curriculum Composition

No.	Curriculum Components	Number of Credits	Credit Distribution (%/Total Credits)
I	**VINCORE**	**35**	**29.2%**
I.1	*Enterprise and Innovation*	4	3.3%
I.2	*Leadership Mindset*	2	1.7%
I.3	*Civic Responsibility*	2	1.7%
I.4	*Ethics*	2	1.7%
I.5	*Community Service Learning*	45 hours	
I.6	*Working with the Brain*	2	1.7%
I.7	*Working with Technology*	4	3.3%
I.8	*Working with Others*	4	3.3%
I.9	*Working with the Self*	90 hours	
I.10	*Integrated Vietnam Studies*	11	9.2%
I.11	*Sustainability and Global Citizenship*	2	1.7%
I.12	*Creative Arts*	2	1.7%
II	**PROFESSIONAL EDUCATION**	**85**	**70.8%**
II.1	*College Core Requirement*	22	18.3%
II.2	*Major (Discipline) Requirement*	29	24.2%
II.3	*Discipline Electives*	21	17.5%
II.4	*Course-related Projects*	2	1.7%
II.5	*Free Electives*	5	4.2%
II.6	*Minor**	15*	
II.7	*Internship/Co-op*	640 hours	
II.8	*Capstone Design*	6	5.0%
	TOTAL (without minor)	**120**	**100%**
	TOTAL (with minor)	**135**	

Important Note:

- The Vincore Program has been isssued along with the Decision No. 342a/2025/QĐ-VUNI dated June 20, 2025.

- Students have the option to obtain a minor in a different area of study. **A minor needs to have at least 15 credits that are not already counted towards the major program.** *Information about the available minors is provided here:* [LINK](#)*.*

- International students are exempted from National Defense Education. However, they are still required to take ideology courses, including: History of the Communist Party, Ho Chi Minh Ideology, Scientific Socialism, Marxism-Leninism Political Economy, Marxism-Leninism Philosophy (In line with Decision No. 494/QĐ-TTg, issued on June 24, 2002, by the Prime Minister).

3.2. Courses and Credit Distribution by Courses

No	Course code	Name of Courses	Credit	Credit Hour Allocation		Pre-requisite(s)	Grading System (Letter Grade or Pass/Fail)
				Theory	Practice		
I	**VINCORE**						
I.1	**Enterprise and Innovation**		**4**				
1	ENTR1022	Agile Innovation and Entrepreneurship	2	2			P/F
2	IDEA1010/ 11/12/X	Big Ideas: X *(The IDEA1010/11/12 series, titled 'Big Ideas (X)' will have its course code and title defined each semester, allowing the course content to align with the key themes and innovative design concepts)*	2	2			L
I.2	**Leadership Mindset**		**2**				
	LEAD1031	Leadership and Teambuilding Bootcamp	2	2			P/F
I.3	**Civic Responsibility**		**2**				
1	VCOR1030	National Defense Education	165 hrs				P/F
2	LAW1010	Introduction to Law	2	2			L
I.4	**Ethics**		**2**				
	TECH1010	Technology Ethics	2	2			L
I.5	**Community Service Learning**						
	COSL1010	Community Service Learning	45 hrs				P/F
I.6	**Working with the Brain**		**2**				
	THINK1010	Critical and Creative Thinking	2	2			L
I.7	**Working with Technology**		**4**				
1	CECS1040	Introduction to AI Literacy	2	2			L
2	*Students select 1 course from the list below*						
2.1	CECS1050	Introduction to Data Literacy	2	2			L
2.2	CECS1031	Computational Thinking	2	2			L
I.8	**Working with Others**		**4**				
1	ENGL1030	Academic and Professional Writing	2	2			L
2	*Students select 1 course from the list below*						
2.1	ENGL1040	Interpersonal and Multimedia Communication	2	2			L

No	Course code	Name of Courses	Credit	Theory	Practice	Pre-requisite(s)	Grading System (Letter Grade or Pass/Fail)
2.2	MANA1011	Introduction to Managing Skills	2	2			
I.9	**Working with the Self**						
1	VCOR1012A /B	OASIS *(Orientation, Advising, Skills, Identity & Diversity and Spirit of Pay-it-Forward)*	45 hrs				P/F
2	VCOR1021	Healthy Lifestyle 1	45 hrs				P/F
	VCOR1022	Healthy Lifestyle 2					
I.10	**Integrated Vietnam Studies**		**11**				
1	HASS1010	Marxism-Leninism Political Economy (Philosophy, Science and Society)	3	3			L
2	HASS1020	Marxism-Leninism Philosophy (Global Political Economy)	2	2			L
3	HASS1030	Scientific Socialism (Politics and Social Change)	2	2			L
4	HASS1041	Ho Chi Minh Ideology (Vietnam: History and Cultures II)	2	2			L
5	HASS1050	History of the Communist Party (Vietnam: History and Cultures I)	2	2			L
I.11	**Sustainability and Global Citizenship** *(students may select 1 course from the list below)*						
1	HASS1070	Cross-Cultural Navigation	2	2			L
2	HASS1100	Introduction to International Relations	2	2			L
3	SUST1010	Humans and Environmental Intelligence	2	2			
4	UROP1010/ 20/30/40	UROP (Undergraduate Research Opportunity Program)	2		2		L
I.12	**Creative Arts** *(students may select 1 course from the list below)*						
1	ARTS1030	Arts Appreciation and Application	2	2			L
2	PERF1010	Artistic Performance and Application	2	2			L

No	Course code	Name of Courses	Credit	Credit Hour Allocation		Pre-requisite(s)	Grading System (Letter Grade or Pass/Fail)
				Theory	Practice		
II	**PROFESSIONAL EDUCATION**						
II.1	**College Core Requirement**		*22*				
1	MATH1010	Calculus I	4	3	1		L
2	MATH1020	Calculus II	4	3	1	MATH1010	L
3	MATH2010	Probability and Statistics	4	3	1	MATH1020	L
4	MATH2050	Linear Algebra	4	3	1		L
5	CECS1011	Introduction to Engineering and Computer Science	2	1	1		L
6	COMP1010	Introduction to Programming	4	2	2		L
II.2	**Major (Discipline) requirement**		*29*				
1	DATA1010	Introduction to Data Science	*4*	*3*	*1*	COMP1010	L
2	DATA2010	Data Science Programming	*4*	*3*	*1*	DATA1010	L
3	DATA4010	Data Science and Society	*4*	*3*	*1*	DATA2010	L
4	COMP1020	Object-oriented Programming and Data Structures	*4*	*3*	*1*	COMP1010	L
5	COMP3030	Databases and Database Systems	3	*2*	*1*	COMP1020	L
6	COMP4040	Data Mining and Big Data Analytics	*3*	*2*	*1*	COMP3020 or DATA1010, COMP1020, MATH2050	L
7	COMP4010	Data Visualization	*3*	*2*	*1*	COMP1010, MATH2010	L
8	COMP3020	Machine Learning	*4*	*3*	*1*	MATH2050, MATH2010, COMP1020	L
II.3	**Discipline Electives**		*21*				
1	COMP2050	Artificial Intelligence	4	3	1	COMP1010, MATH2010	L
2	MATH2020	Discrete Mathematics	4	3	1	MATH2010	L
3	MATH4010	Advanced Probability and Statistics	3	2	1	COMP3020, COMP1020	L
4	COMP3040	Computer Vision	3	2	1	COMP3020, COMP1020, MATH2050	L
5	COMP4020	Natural Language Processing	3	2	1	COMP3020, COMP1020	L

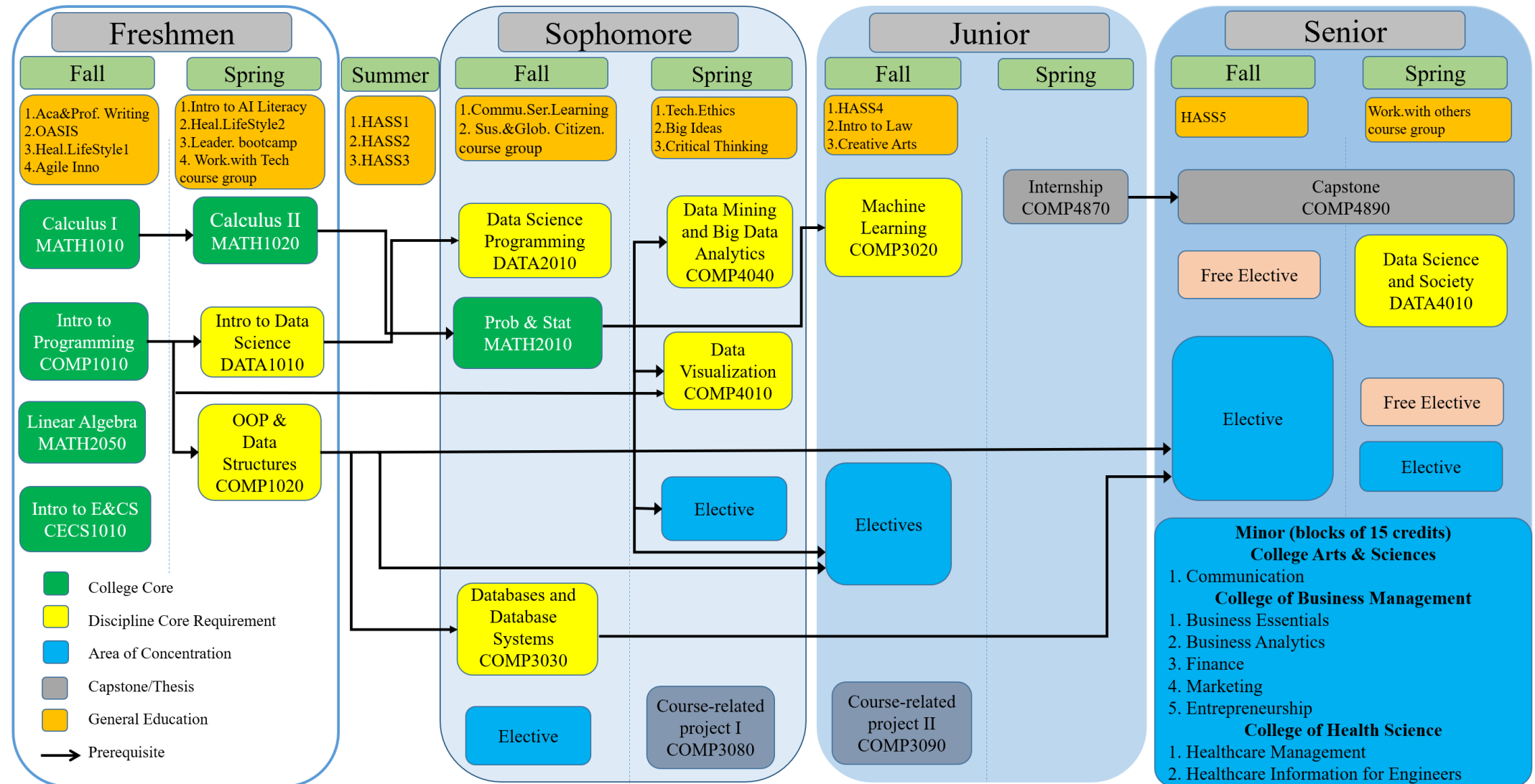| No	Course code	Name of Courses	Credit	Theory	Practice	Pre-requisite(s)	Grading System (Letter Grade or Pass/Fail)
6	COMP3010	Algorithm Design	4	3	1	MATH2020, COMP1020	L
7	COMP2030	Software Construction	4	3	1	COMP1020	L
8	COMP4030	Cybersecurity	3	2	1	COMP1020, MATH2020	L
9	MATH3010	Optimization	4	3	1		L
10	ACCT2010	Introduction to Financial Accounting	3	2	1		L
11	MARK1010	Marketing	3	3			L
12	BANA3050	Management Information Systems	3	3			L
13	ENTR3010	Entrepreneurship Perspectives	3	3			L
14	COMM1010	Introduction to Communication	3	3			L
15	NURS2221	HealthTech & Innovation	3	2	1		L
II.4	**Course-related Projects**		**2**				
1	COMP3080	Course-related Project 1	*1*		*1*		L
2	COMP3090	Course-related Project 2	*1*		*1*		L
II.5	**Free Electives**		**5**				
II.6	**Minor** *(Students may take minor in Business Essentials, Finance, Marketing, Communications, Healthcare Management, Healthcare Information for Engineers or other minors offered by other colleges)*		*15*				
II.7	**Internship**						
1	COMP4870	Internship	*640 hrs*			Sophomore Standing	P/F
2	CECS1090	Experiential Learning – Company Field Trips *(student must participate in at least 3 trips)*	*Non-credit*				P/F
II.8	**Capstone Design**		**6**				
	COMP4890	Capstone Design Project	*6*		*6*		L

3.3. Curriculum Block

VINCORE (35 credits)
I.1. CHARACTER (10 credits)
I.1.1. Enterprise and Innovation (4 credits)
- Agile Innovation and Entrepreneurship (2)
- Big Ideas: X (2)
I.1.2. Leadership Mindset (2 credits)
- Leadership and Teambuilding Boot Camp (2)
I.1.3. Civic Responsibility (2 credits)
- Introduction to Law (2)
- National Defense Education (165 hrs)
I.1.4. Ethics (2 credits)
- Technology Ethics (2)
I.1.5. Community Service Learning (45 hrs)
- Community Service Learning (45 hrs)
I2. CAREER (10 credits)
I.2.1. Working with the Brain (2 credits)
- Critical and Creative Thinking (2)
I.2.2. Working with Technology (4 credits)
- Introduction to AI Literacy (2)
- Introduction to Data Literacy/ Computational Thinking (2)
I.2.3. Working with Others (4 credits)
- Academic and Professional Writing (2)
- Interpersonal and Multimedia Communication/Introduction to Managing Skills (2)
I.2.4. Working with the Self
- OASIS (Orientation, Advising, Skills, Identity & Diversity and Spirit of Pay-it-Forward) (45 hrs)
- Healthy Lifestyle (45 hrs)
I.3. CONNECTIONS (15 credits)
I.3.1. Integrated Vietnam Studies (11 credits)
- Marxism-Leninism Philosophy (Philosophy, Science and Society) (3)
- Marxism-Leninism Political Economy (Global Political Economy) (2)
- Scientific Socialism (Politics and Social Change) (2)
- History of the Communist Party (Vietnam: History and Cultures I) (2)
- Ho Chi Minh Ideology (Vietnam: History and Cultures II) (2)
I.3.2. Sustainability and Global Citizenship (2 credits)
- Cross-Cultural Navigation/Introduction to International Relations/Humans and Environmental Intelligence/UROP (Undergraduate Research Opportunity Program) (2)
I.3.3. Creative Arts (2 credits)
- Arts Appreciation and Application/Artistic Performance and Application (2)

II.1. COLLEGE CORE (22 credits)
- Calculus I (4)
- Calculus II (4)
- Linear Algebra (4)
- Probability and Statistics (4)
- Introduction to Engineering and Computer Science (2)
- Introduction to Programming (4)

II.2. MAJOR (DISCIPLINE) (29 credits)
- Introduction to Data Science (4 credits)
- Data Science Programming (4 credits)
- Data Science and Society (4 credits)
- Object-oriented Programming and Data Structures (4)
- Machine Learning (4)
- Databases and Database Systems (3)
- Data Mining and Big Data Analytics (3)
- Data Visualization (3)

II.3. DISCIPLINE ELECTIVES (21 credits)
- Artificial Intelligence (4)
- Discrete Mathematics (4)
- Algorithm Design (4)
- Software Construction (4)
- Advanced Probability and Statistics (3)
- Computer Vision (3)
- Natural Language Processing (3)
- Cybersecurity (3)
- Optimization (4)
- Introduction to Financial Accounting (3)
- Marketing (3)
- Management Information Systems (3)
- Entrepreneurship Perspectives (3)
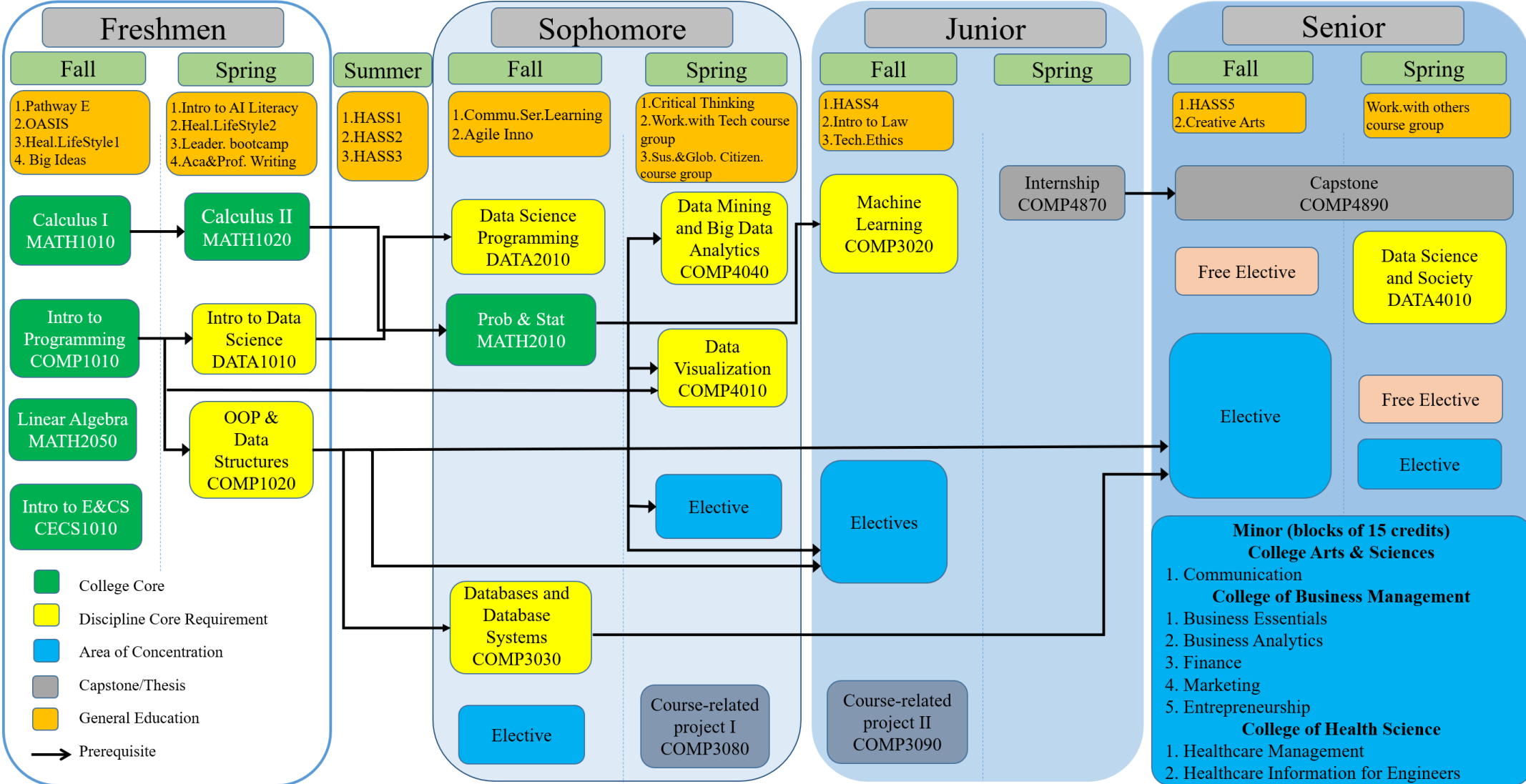- Introduction to Communication (2)
- Health Informatics (3)

BACHELOR OF SCIENCE IN DATA SCIENCE (120 credits)

II.4. COURSE-RELATED PROJECTS (2 credits)
- Course-related Project 1 (1)
- Course-related Project 2 (1)

II.5. FREE ELECTIVES (5 credits)

II.6. MINOR (15 credits)
Students may take minor in Business Essentials, Finance, Marketing, Communications, Healthcare Management, Healthcare Information for Engineers or other minors offered by other colleges

II.7. PRACTICE/ INTERNSHIP
- Internship (640 hrs)
- Experiential Learning – Company Field Trips (Student must participate at least 3 trips) (Non-credit)

II.8. GRADUATION THESIS/CAPSTONE (6 credits)
- Capstone Design (6)

3.4. Curriculum Learning Roadmap

For Main Track

Freshmen

Fall
1. Aca&Prof. Writing
2. OASIS
3. Heal.LifeStyle1
4. Agile Inno

Spring
1. Intro to AI Literacy
2. Heal.LifeStyle2
3. Leader. bootcamp
4. Work.with Tech course group

Summer
1. HASS1
2. HASS2
3. HASS3

- Calculus I MATH1010
- Calculus II MATH1020
- Intro to Programming COMP1010
- Intro to Data Science DATA1010
- Linear Algebra MATH2050
- OOP & Data Structures COMP1020
- Intro to E&CS CECS1010

Sophomore

Fall
1. Commu.Ser.Learning
2. Sus.&Glob. Citizen. course group

Spring
1. Tech.Ethics
2. Big Ideas
3. Critical Thinking

- Data Science Programming DATA2010
- Prob & Stat MATH2010
- Data Mining and Big Data Analytics COMP4040
- Data Visualization COMP4010
- Elective
- Databases and Database Systems COMP3030
- Elective
- Course-related project I COMP3080

Junior

Fall
1. HASS4
2. Intro to Law
3. Creative Arts

Spring

- Machine Learning COMP3020
- Internship COMP4870
- Electives
- Course-related project II COMP3090

Senior

Fall
HASS5

Spring
Work.with others course group

- Capstone COMP4890
- Free Elective
- Data Science and Society DATA4010
- Elective
- Free Elective
- Elective

Minor (blocks of 15 credits)
College Arts & Sciences
1. Communication
College of Business Management
1. Business Essentials
2. Business Analytics
3. Finance
4. Marketing
5. Entrepreneurship
College of Health Science
1. Healthcare Management
2. Healthcare Information for Engineers

Legend:
- College Core
- Discipline Core Requirement
- Area of Concentration
- Capstone/Thesis
- General Education
- → Prerequisite

For Pathway Track

Freshmen

Fall
1. Pathway E
2. OASIS
3. Heal.LifeStyle1
4. Big Ideas

Spring
1. Intro to AI Literacy
2. Heal.LifeStyle2
3. Leader. bootcamp
4. Aca&Prof. Writing

Summer
1. HASS1
2. HASS2
3. HASS3

Calculus I MATH1010

Calculus II MATH1020

Intro to Programming COMP1010

Intro to Data Science DATA1010

Linear Algebra MATH2050

OOP & Data Structures COMP1020

Intro to E&CS CECS1010

Sophomore

Fall
1. Commu.Ser.Learning
2. Agile Inno

Spring
1. Critical Thinking
2. Work.with Tech course group
3. Sus.&Glob. Citizen. course group

Data Science Programming DATA2010

Prob & Stat MATH2010

Data Mining and Big Data Analytics COMP4040

Data Visualization COMP4010

Elective

Databases and Database Systems COMP3030

Elective

Course-related project I COMP3080

Junior

Fall
1. HASS4
2. Intro to Law
3. Tech.Ethics

Spring

Machine Learning COMP3020

Internship COMP4870

Electives

Course-related project II COMP3090

Senior

Fall
1. HASS5
2. Creative Arts

Spring
Work.with others course group

Capstone COMP4890

Free Elective

Data Science and Society DATA4010

Elective

Free Elective

Elective

Minor (blocks of 15 credits)
College Arts & Sciences
1. Communication
College of Business Management
1. Business Essentials
2. Business Analytics
3. Finance
4. Marketing
5. Entrepreneurship
College of Health Science
1. Healthcare Management
2. Healthcare Information for Engineers

Legend:
- College Core
- Discipline Core Requirement
- Area of Concentration
- Capstone/Thesis
- General Education
- → Prerequisite

3.5.Standard Study Plan

For Main Track

Semester 1:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	MATH1010	Calculus I	Giải tich I	4
2	MATH2050	Linear Algebra	Đại số Tuyến tính	4
3	COMP1010	Introduction to Programming	Nhập môn Lập trình	4
4	CECS1011	Introduction to Engineering and Computer Science	Nhập môn kỹ thuật và KHMT	2
5	ENTR1022	Agile Innovation and Entrepreneurship	Khởi nghiệp và Đổi mới sáng tạo	2
6	ENGL1030	Academic and Professional Writing	Kỹ năng viết học thuật	2
7	VCOR1012A/B	OASIS	OASIS	Non-credit
8	VCOR1021	Healthy Lifestyle 1	Lối sống Khoẻ Mạnh 1	Non-credit
		Total		18

Semester 2:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	MATH1020	Calculus II	Giải tich II	4
2	DATA1010	Introduction to Data Science	Nhập môn Khoa học Dữ liệu	4
3	COMP1020	Object-oriented Programming and Data Structures	Lập trình hướng đối tượng và Cấu trúc dữ liệu	4
4	LEAD1031	Leadership and Teambuilding Bootcamp	Trại huấn luyện kỹ năng lãnh đạo và làm việc nhóm	2
5	CECS1031/ CECS1050	Computational Thinking/Introduction to Data Literacy	Tư Duy Máy Tính/ Nhập Môn Hiểu Biết về Dữ Liệu	2
6	CECS1040	Introduction to AI Literacy	Nhập môn Trí tuệ Nhân tạo	2
7	VCOR1022	Healthy Lifestyle 2	Lối sống Khoẻ Mạnh 2	Non-credit
		Total		18

Summer 1:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	HASS1010	Marxism-Leninism Political Economy (Philosophy, Science and Society)	Triết học Mác-Lênin (Triết học, Khoa học và Xã hội)	3
2	HASS1020	Marxism-Leninism Philosophy (Global Political Economy	Kinh tế Chính trị Mác-Lênin (Kinh tế chính trị toàn cầu)	2
3	HASS1030	Scientific Socialism (Politics and Social Change)	Chủ Nghĩa Xã Hội Khoa Học (Chính trị và Biến đổi Xã hội)	2
		Total		7

Semester 3:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	DATA2010	Data Science Programming	Lập trình cho Khoa học dữ liệu	4
2	MATH2010	Probability and Statistics	Xác suất Thống kê	4
3	COMP3030	Databases and Database Systems	Cơ sở dữ liệu và các hệ thống cơ sở dữ liệu	3
4		Discipline Elective 1	Môn tự chọn chuyên ngành 1	4
5	HASS1070/ HASS100/UROP /SUST1010	Cross Cultural Navigation/Introduction to International Relations/Undergraduate Research Opportunities Program/Humans and Environmental Intelligence	Định Hướng Liên Văn Hoá/ Nhập Môn Quan Hệ Quốc Tế/Cơ hội nghiên cứu cho sinh viên/Con người và Trí tuệ Môi trường	2
6	COSL1010	Community Service Learning	Học tập qua phục vụ cộng đồng	Non-credit
		Total		17

Semester 4:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP4004	Data Mining and Big Data Analytics	Khai phá dữ liệu và Phân tích dữ liệu quy mô lớn	3
2	COMP4010	Data Visualization	Trực quan hóa dữ liệu	3
3		Discipline Elective 2	Môn tự chọn chuyên ngành 2	4
4	COMP3080	Course-related Project 1	Dự án liên quan khóa học 1	1
6	IDEA10xx	Big Ideas	Ý tưởng lớn	2
7	THINK1010	Critical and Creative Thinking	Tư Duy Sáng Tạo và Phản Biện	2
8	TECH1010	Technology Ethics	Đạo Đức Trong Công Nghệ	2
		Total		17

Summer 2:

Internship or exchange	Non-credit

Semester 5:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP3020	Machine Learning	Máy học	4
2		Discipline Elective 3	Môn tự chọn chuyên ngành 3	4
3		Discipline Elective 4	Môn tự chọn chuyên ngành 4	3
4	COMP3090	Course-related Project 2	Dự án liên quan khóa học 2	1
5	LAW1010	Introduction to Law	Pháp Luật Đại Cương	2
6	HASS1041/42	Ho Chi Minh Ideology (Vietnam: History and Cultures II)	Tư Tưởng Hồ Chí Minh (Lịch sử và Văn hóa Việt Nam II)	2
7	ARTS1030/ PERF1010	Arts Appreciation and Application / Artistic Performance and Application	Thưởng Thức và Thực Hành Nghệ Thuật/ Biểu Diễn và Thực Hành Nghệ Thuật	2
		Total		18

Semester 6:

Co-op semester	Credits

Summer 3:

Internship or exchange	Non-credit

Semester 7

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP4890	Capstone Design	Đồ án tốt nghiệp	3
2		Discipline Elective 5	Môn tự chọn chuyên ngành 5	3
3		Free Electives		5
4	HASS1050	History of the Communist Party (Vietnam: History and Cultures I)	Lịch Sử Đảng Cộng Sản Việt Nam (Lịch sử và Văn hóa Việt Nam I)	2
		Total		13

Semester 8:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP4890	Capstone Design	Đồ án tốt nghiệp	3
2	DATA4010	Data Science and Society	Môn tự chọn chuyên ngành 6	4
3		Discipline Elective 6	Môn tự chọn chuyên ngành 6	3
4	ENGL1040/ MANA1011	Interpersonal and Multimedia Communication/ Introduction to Managing Skills	Giao Tiếp Cá Nhân và Đa Phương tiện truyền thông/ Nhập môn kỹ năng quản lý	2
		Total		12

For Pathway Track

Semester 1:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	MATH1010	Calculus I	Giải tich I	4
2	MATH2050	Linear Algebra	Đại số Tuyến tính	4
3	COMP1010	Introduction to Programming	Nhập môn Lập trình	4
4	CECS1011	Introduction to Engineering and Computer Science	Nhập môn kỹ thuật và KHMT	2
5	IDEA10xx	Big Ideas	Ý tưởng lớn	2
6		Pathway English	Tiếng anh học thuật chuyển tiếp	Non-credit
7	VCOR1012A/B	OASIS	OASIS	Non-credit
8	VCOR1021	Healthy Lifestyle 1	Lối sống Khoẻ Mạnh 1	Non-credit
		Total		16

Semester 2:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	MATH1020	Calculus II	Giải tich II	4
2	DATA1010	Introduction to Data Science	Nhập môn Khoa học Dữ liệu	4
3	COMP1020	Object-oriented Programming and Data Structures	Lập trình hướng đối tượng và Cấu trúc dữ liệu	4
4	LEAD1031	Leadership and Teambuilding Bootcamp	Trại huấn luyện kỹ năng lãnh đạo và làm việc nhóm	2
5	ENGL1030	Academic and Professional Writing	Kỹ năng viết học thuật	2
6	CECS1040	Introduction to AI Literacy	Nhập môn Trí tuệ Nhân tạo	2
7	VCOR1022	Healthy Lifestyle 2	Lối sống Khoẻ Mạnh 2	Non-credit
		Total		18

Summer 1:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	HASS1010	Marxism-Leninism Political Economy (Philosophy, Science and Society)	Triết học Mác-Lênin (Triết học, Khoa học và Xã hội)	3
2	HASS1020	Marxism-Leninism Philosophy (Global Political Economy	Kinh tế Chính trị Mác-Lênin (Kinh tế chính trị toàn cầu)	2
3	HASS1030	Scientific Socialism (Politics and Social Change)	Chủ Nghĩa Xã Hội Khoa Học (Chính trị và Biến đổi Xã hội)	2
		Total		7

Semester 3:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	DATA2010	Data Science Programming	Lập trình cho Khoa học dữ liệu	4
2	MATH2010	Probability and Statistics	Xác suất Thống kê	4
3	COMP3030	Databases and Database Systems	Cơ sở dữ liệu và các hệ thống cơ sở dữ liệu	3
4		Discipline Elective 1	Môn tự chọn chuyên ngành 1	4
5	ENTR1022	Agile Innovation and Entrepreneurship	Khởi nghiệp và Đổi mới sáng tạo	2
6	COSL1010	Community Service Learning	Học tập qua phục vụ cộng đồng	Non-credit
		Total		17

Semester 4:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP4004	Data Mining and Big Data Analytics	Khai phá dữ liệu và Phân tích dữ liệu quy mô lớn	3
2	COMP4010	Data Visualization	Trực quan hóa dữ liệu	3
3		Discipline Elective 2	Môn tự chọn chuyên ngành 2	4
4	COMP3080	Course-related Project 1	Dự án liên quan khóa học 1	1
5	CECS1031/ CECS1050	Computational Thinking/Introduction to Data Literacy	Tư Duy Máy Tính/ Nhập Môn Hiểu Biết về Dữ Liệu	2
6	HASS1070/ HASS100/UROP /SUST1010	Cross Cultural Navigation/Introduction to International Relations/Undergraduate Research Opportunities Program/Humans and Environmental Intelligence	Định Hướng Liên Văn Hoá/ Nhập Môn Quan Hệ Quốc Tế/Cơ hội nghiên cứu cho sinh viên/Con người và Trí tuệ Môi trường	2
7	THINK1010	Critical and Creative Thinking	Tư Duy Sáng Tạo và Phản Biện	2
		Total		17

Summer 2:

Internship or exchange	Non-credit

Semester 5:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP3020	Machine Learning	Máy học	4
2		Discipline Elective 3	Môn tự chọn chuyên ngành 3	4
3		Discipline Elective 4	Môn tự chọn chuyên ngành 4	3
4	COMP3090	Course-related Project 2	Dự án liên quan khóa học 2	1
5	LAW1010	Introduction to Law	Pháp Luật Đại Cương	2
6	HASS1041/42	Ho Chi Minh Ideology (Vietnam: History and Cultures II)	Tư Tưởng Hồ Chí Minh (Lịch sử và Văn hóa Việt Nam II)	2
7	TECH1010	Technology Ethics	Đạo Đức Trong Công Nghệ	2
		Total		18

Semester 6:

Co-op semester	Credits

Summer 3:

Internship or exchange	Non-credit

Semester 7

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP4890	Capstone Design	Đồ án tốt nghiệp	3
2		Discipline Elective 5	Môn tự chọn chuyên ngành 5	3
3		Free Electives		5
4	ARTS1030/ PERF1010	Arts Appreciation and Application / Artistic Performance and Application	Thưởng Thức và Thực Hành Nghệ Thuật/ Biểu Diễn và Thực Hành Nghệ Thuật	2
5	HASS1050	History of the Communist Party (Vietnam: History and Cultures I)	Lịch Sử Đảng Cộng Sản Việt Nam (Lịch sử và Văn hóa Việt Nam I)	2
		Total		15

Semester 8:

No	Course Code	Course name (English)	Course name (Vietnamese)	Credits
1	COMP4890	Capstone Design	Đồ án tốt nghiệp	3
2	DATA4010	Data Science and Society	Môn tự chọn chuyên ngành 6	4
3		Discipline Elective 6	Môn tự chọn chuyên ngành 6	3
4	ENGL1040/ MANA1011	Interpersonal and Multimedia Communication/ Introduction to Managing Skills	Giao Tiếp Cá Nhân và Đa Phương tiện truyền thông/ Nhập môn kỹ năng quản lý	2
		Total		12

3.6. Course Descriptions

3.6.1. VINCORE Courses

ENTR1022 Agile Innovation and Entrepreneurship

Credit: 2

Pre-requisite: None

The purpose of this course is to provide students with a basic understanding of the innovation/entrepreneurial process and experiential learning opportunities to practice and refine those skills. This course is highly interactive and involves a mix of lectures and activities to immediately apply course concepts. The course is intended for students from all academic disciplines and intended to provide skills that are applicable in many other aspects of life beyond creating a new venture.

Students will gain a broader perspective of both the challenges (i.e. organizational and institutional) and opportunities (i.e. unmet customer needs and possibilities for future ventures) for innovation.

As part of this class, students will form teams for a Hackathon event where they will generate innovative solutions to real-world problems. Students will learn and apply team innovation processes, business model innovation, design thinking, creativity management, product pitches, data analysis, critical thinking, and product innovation. This course also helps students build their professional network.

IDEA1010/11/12 Series: Big Ideas (X)

2 credits

Pre-requisite: N/A

On successful completion of this course, students will be able to:

1. Describe and explain a "big idea", which may be a new solution to a problem, a disrupting technology, or an innovative method or way of doings things

2. Identify the implications of a big idea for everyday life or a professional setting

3. Develop a strategy for using a big idea to improve an existing approach or create a new application

4. Evaluate the application of a big idea, including an assessment of its positive impacts, negative impacts, and mitigating strategies for the theme of the year

TECH1010 Technology Ethics

2 credits

Pre-requisite: N/A

On successful completion of this course, students will be able to:

1. Understand and explain the principles and values applied to technology, including privacy and data protection, algorithmic fairness and bias, digital inclusion, accountability and transparency, sustainability, and ethical AI and machine learning)

2. Identify uses of technology that produce unethical behavior or harm to users, society, or the environment

3. Apply relevant ethical theories to moral dilemmas involving technology

4. Evaluate different responses to ethical practice in technologies and justify an opinion based on ethical theory

COSL1010 Community Service Learning

45 hours

Pre-requisite: N/A

The Introduction to Service-Learning is a P/F, course which aims to promote skill-building: reflection, empathy, teamwork, oral communication, written communication (in your reflective journals), and attitudes: societal awareness and social responsibility. Students can choose from different topics such as pollution, teaching, or cultural preservation which change from year to year (see examples below).

In addition, this class focuses on project-based activities during the 8 in-person sessions and requires additional hours participating in a service-learning field experience.

For this course, students will unpack their own motivations and identity related to social issues using a public narrative and concepts related to civic engagement.

CECS1031 Computational Thinking

2 credits

Pre-requisite: N/A

This course is designed for students with no prior background in computing, offering them foundational skills to analyze problems, design computational solutions, and implement basic programs. Through hands-on labs and interdisciplinary case studies, students will learn to approach challenges in areas such as business, economics, engineering, and healthcare. By emphasizing core concepts such as abstraction, algorithms, efficiency, and correctness, this course fosters critical thinking and practical problem-solving abilities. It also introduces students to emerging topics like artificial intelligence, data science, and ethical computing, helping them become informed and adaptable digital citizens.

CECS1050 Introduction to Data Literacy

2 credits

Pre-requisite: N/A

This course provides a foundational understanding of data collection, analysis, and interpretation. The course equips students with practical skills in data visualisation and problem-solving using tools such as Excel and Python. Students will gain insights into the entire data lifecycle, from data collection and cleaning to analysis and presentation within data-centric projects. The course will also introduce basic probabilistic ideas and ethical considerations in data. Learning will occur through lectures, recitations, and projects, with assessment based on quizzes, take-away activities, and in-class project presentations. Upon completion, students will be able to interpret data sets, articulate data analysis workflows, apply data visualisation techniques, and function effectively within data-centric projects.

CECS1040 Introduction to AI Literacy

2 credits

Pre-requisite: N/A

This course provides a foundational understanding of the fundamental concepts, principles, and key technologies underlying Artificial Intelligence. The course equips students with the competence to use contemporary AI tools, such as ChatGPT for work and study tasks. Students will cultivate the ability to discuss the significant ethical considerations and societal impacts associated with AI systems, including data privacy and algorithmic bias. Furthermore, the course will explore how AI together with appropriate user interfaces can be strategically applied to improve efficiency and foster innovation in academic and professional settings. Learning will occur through lectures, and assessment will be based on individual assessments and a group assignment. Upon completion, students will be able to understand basic AI principles, use AI tools effectively, recognise ethical implications, apply AI to improve efficiency and innovation, and contrast user interfaces for better human-AI interaction.

ENGL1040 Interpersonal and Multimedia Communication

2 credits

Pre-requisite: N/A

On successful completion of this course, students will be able to:

1. Identify and explain the fundamental concepts, scope, and diversity of oral and visual communication.

2. Identify communication expectations based on an understanding of different professional audiences and contexts and apply this knowledge in delivering communication.

3. Demonstrate responsible, ethical, and respectful attitudes as the field undergoes disruptive changes fueled by rapid technological advancements.

4. Develop your own oral communication skills in key situations, from speeches to conversation, discussion, giving feedback.

5. Grow your skills in developing digital content for multimedia, including presentations, pitches, blog posts, viral videos, podcasts, and basic media management.

MANA1011 Introduction to Managing Skills

2 credits

Pre-requisite: N/A

On successful completion of the course, students will be able to:

1. Apply the SMART technique to define specific, measurable, achievable, relevant, and time-bound goals, ensuring clarity and focus on their objectives.

2. Develop skills to effectively organize tasks and prioritize them based on importance and urgency, facilitating efficient and systematic progress towards achieving objectives.

3. Understand how to assign tasks based on team members' individual strengths, skills, and expertise, ensuring optimal use of resources, and enhancing team performance.

4. Learn to create and manage project schedules, monitor progress, and employ motivational techniques to keep team members engaged and productive, overcoming challenges and maintaining momentum.

5. Acquire the ability to give professional, accurate, and timely feedback, fostering a positive energy and environment within the team.

HASS1100 Introduction to International Relations

2 credits

Pre-requisite: N/A

On successful completion of this course, students will be able to:

1. Know the main actors, structures, and processes of international relations

2. Understand the basic theoretical principles of international relations and compare the competing underlying frameworks on human and social nature

3. Identify the respective objectives of international organizations in international politics, collaboration, and cooperation

4. Explore a case study, problem-solving scenario or dilemma involving international relations and devise a strategy/solution supported by theory and solid argumentation

5. Critically assess alternative strategies and points of view on complex scenarios requiring international relations

ARTS1030 Art Appreciation and Application

2 credits

Pre-requisite: N/A

On successful completion of this course, students will be able to:

1. Demonstrate an understanding and appreciation of arts and visual arts in general, including their function, and historical, religious, cultural, social, and environmental contexts and relevance;

2. Understand and define the basic principles of arts, visual arts, and design; explain and analyze a work of art from an informed and objective viewpoint, its physical attributes and formal construction;

3. Identify how art works are created and processed;

4. Make a reference to the significance and application of the arts in students' own field of studies and interests;

5. Analyze Vietnam arts and situate Vietnam arts in the global context.

PERF1010 Artistic Performance and Application

2 credits

Pre-requisite: N/A

On successful completion of this course, students will be able to:

1. Show improved skill in their chosen artistic field (e.g., music, dance, theatre, visual arts) and express their creativity and individuality through performance(s).

2. Evaluate and discuss different forms of artistic performance, identifying key elements and techniques, and write reflective assessments on their personal artistic development.

3. Work well with peers to create and perform artistic pieces, and effectively give and receive constructive feedback.

4. Clearly communicate the artistic vision and choices behind their performances both verbally and in writing (if required) and develop their skills in presenting artistic work to an audience, including stage presence and audience engagement.

5. Explore and appreciate a variety of artistic traditions from around the world, with a special focus on Vietnamese culture, and place their own artistic work in a wider cultural and historical context.

6. Plan, organize, and complete an artistic performance project from start to finish, demonstrating good time management and organizational skills.

7. Understand and apply ethical considerations in artistic performance, including respecting intellectual property and cultural sensitivities, and behave professionally during rehearsals, performances, and collaborative projects.

ENGL1030 Academic and Professional Writing

Credit: 2

Pre-requisite: NA

On successful completion of this unit, students will be able to:

1. Identify and explain core attitudes, values, and practices of academic culture and how academic writing reflects these.

2. Reflect critically on the differences between academic and opinion writing and apply this understanding in the composition of academic essays, including referencing, quoting, and paraphrasing.

3. Evaluate the differences between academic and professional writing in terms of style, purpose, target audience, and techniques.

4. Develop your clear, concise, and well-structured writing skills, focusing on the most critical documents and situations in academic and professional work such as academic essays, newspaper articles, business reports, proposals, speeches...

5. Use AI to develop, enhance, and revise writing in both academic and professional contexts.

LEAD1031 Leadership and Team building Bootcamp

2 credits

Pre-requisites: None

This course is designed for all students to assist in leadership and teamwork development and training within an experiential outdoor setting.

This course offers hands-on leadership concepts and frameoworks that can be used for real-world situations. For example, collaboration, teamwork, communication, conflict resoluation through immersion in challenging scenarios.

THINK1010 Critical & Creative Thinking

2 credits

Pre-requisites: None

In this course students will develop their critical thinking skills through studying the nature of arguments, good reasoning, fallacies, and the art of debating. Different kinds of arguments will be presented, such as the distinction between deduction and induction, as well as causal reasoning in the sciences. With an eye on application to real-world issues, students will apply the reasoning skills they develop to evaluate and improve arguments from case studies. The examples chosen will be reflective of STEM and Business content so they can see the relevance of the skills developed to their own major and future career. Creative thinking will be developed through the study of problem-solving cases and training in various methods of idea generation. This will culminate in a case-based competition in the final two classes that will be introduced and judged by an industry expert.

HASS1070 Cross Cultural Navigation

2 credits

Pre-requisite: None

To thrive in the 21st century, young people must be able to navigate cross-cultural differences and achieve a level of cultural intelligence (CQ) – the ability to adapt to and understand culturally diverse contexts – as never before. The global impact of the Covid 19 pandemic has only further confirmed this need. Consequently, this course helps students to explore the cross-cultural experience, examine their own cultural biases, and prepare for the demands of 21st-century interconnectedness.

The main goal of this course is that everyone (including the instructor and TA) will become a better cross-cultural communicator. We will explore together and learn from each other.

Therefore, Cross-Cultural Navigation (CCN) explores factors that influence communication in an intercultural context as well as the rules and customs governing behavior. We will approach communication from the perspective of Anthropology and Cultural Geography, understanding that all relationships and group dynamics are developed and fostered within a specific cultural context. With this in mind, the course will cover a host of topics relating to communication including Ethics, Social Structure, Religion, Communication, National Identity, Decision-making, and Leadership.

CCN will primarily focus on practical applications and case studies. Lectures will be used to frame and enhance content. We will explore how to communicate effectively in a multicultural environment and how to manage, negotiate, and resolve cross-cultural conflicts. Students will engage in real-world and simulated cross-cultural scenarios, to gain practical experience relevant to cooperating with and living with people from diverse backgrounds. In these simulations, as well as in-class discussions, course members will analyze and reflect critically upon the multifaceted

nature of communication, which includes verbal, non-verbal, and written forms of expression, as well as central customs and practices that give shape to relationships.

VCOR1021/22 Healthy Lifestyle 1, 2

Credit: non-credit, required min 45 hours across Year 1

Pre-requisite: None

"Healthy Lifestyle" is a mandatory and non-credit bearing course of the General Education Program. Undergraduate students are required to enroll in this course to fulfill part of the graduation requirements and are expected to complete it by the end of their first-year study. This course provides the essential knowledge, skills and practicum lessons (exercise/sport classes), whereby students are able to develop a suitable approach in attaining a physically, mentally, socially and spiritually healthy lifestyle.

Specifically, this course provides students with the knowledge to make better choices during their daily routines to build a healthy lifestyle. A healthy lifestyle includes physical wellbeing, psychosocial, and spiritual health. Students receive mentorship that guides and shapes their perspective, showcasing the importance of having a well-balanced life. Components of a healthy lifestyle will be discussed as a process and science that allows students to have a greater understanding of what it takes to achieve their goals for overall wellbeing. Nutrition and diet will be taught to dispel the myths about how and what you should eat to achieve desired health results. Having a healthy mind, healthy body, clarity of thought and the ability to effectively process information are key trademarks of a healthy lifestyle.

This course emphasizes practical application of the learned concepts in order to integrate subject matter into students' current daily routines and throughout life. The majority of coursework will be held in different environments and venues in order to expose students to the many varieties of fitness tools and resources to maintain a healthy foundation.

HASS1010 Marxism-Leninism Philosophy (Philosophy Science and Society)

3 credits

Pre-requisite: NA

Marxist-Leninist Philosophy

Marxist-Leninist Philosophy (MLP) is a compulsory course in university curriculum according to the Vietnam Ministry of Education and Training (MOET). The course provides students with basic and foundational understanding of philosophy in general and Marxist-Leninist philosophy in particular. It is the prerequisite for other courses in the block of compulsory political and theoretical courses required by MOET (the others include: Marxist-Leninist Political Economics, Scientific Socialism, The Revolutionary Way of The Communist Party of Vietnam, and Ho Chi Minh

Thoughts). MLP also plays the role of preparing students for the scientific and academic contents that they will study in different majors at VinUniversity.

As an introduction to philosophy, MLP aims at widening students' worldviews and stimulating their critical thinking. As a presentation of Marxist-Leninist philosophy, the official political ideology of the Communist Party of Vietnam (CPV) and the Socialist Republic of Vietnam, MLP provides students the most basic philosophical contents of Marxism and Leninism as well as the theoretical improvisation and development of the CPV. As a methodological preparation for students' academic journey at VinUniversity, MLP spares a small amount of its weekly contents to relate the philosophical knowledge with the development of science and society. Students will start the course with an overview of the role of Philosophy and Metaphysics and examples of important philosophical ideas East and West. The course then focuses on the presentation of Marxist worldview and method via two components: Dialectical Materialism—the Marxist philosophy of nature and Historical Materialism—the Marxist philosophy of history and human beings.

Integrated Studies: Philosophy, Science and Society

Philosophy, Science & Society (PSS) provides students with a broad survey of key ideas in Philosophy, its relevance to society and the way we think we understand the world, or to put it broadly, "science." We begin the course with an overview of the role of Epistemology and Metaphysics as we embark on this journey of critically re-examining the way we look at our world. In the second part of the course, we take a deep dive into questions of Scientific Progress based on which students can orient and develop their creative thinking, philosophy of humanity and action. We follow up with an exploration of trends that came into being with the "social turn" of epistemology found in the critical works of Thomas Kuhn and later in the burgeoning body of works clustered as Sociology of Science. Following this radical re-thinking, we return to the fundamental questions about humanity posed in Social Philosophy and Ethics, to round up our critical inquiry of the complex relationship among philosophy, science and society. PSS is one of four courses in the General Education Program forming the ideology/national education component required for higher education curriculum as directed by the Ministry of Education & Training, Socialist Republic of Vietnam. This course forms 3 credits out of a total of 12 credits dedicated to this requirement for higher education curriculum. These four courses are written to achieve the primary objective of helping students understand core values of both country and university through objective and critical academic lenses in a global context. As these courses will be taught in English to students for whom English is mainly a second language at VinUniversity, each course is designed to be delivered in the spirit of content-based language learning approach to help students both develop English language competency (focusing on speaking, listening and reading) and basic understanding of the content.

HASS1020 Marxism-Leninism Political Economy (Global Political Economy)

2 credits

Pre-requisite: NA

Marxism-Leninism Political Economy

Marxist-Leninist Political Economy is a compulsory course in the undergraduate curriculum. This course aims to systematically equip students with knowledge of the economic theory of Marxism-Leninism and the general economic model of contemporary Vietnam, as defined and implemented by the Communist Party of Vietnam, the sole ruling party in the country. The course helps students enhance their understanding of economics and politics, gain a clear insight into the major issues facing the country and the nation in relation to global and contemporary challenges. It also contributes to fostering patriotism, a sense of responsibility, national pride, dignity, self-reliance, and the determination for national independence.

Global Political Economy: Vietnam-the Region-the World

This component offers opportunities to study how various political and economic actors, systems, conditions, and schools of thought interact and influence each other in shaping the world around us. The course would engage complex questions as to why various issues and challenges including climate change, international trade, poverty have no pure political or economic explanation? Why do foreign economic policies defy the logic of economics? The course begins with an introduction to *Political Economy* and a survey of various political-economic actors and select schools of economic thought. The students will be presented with nuanced narratives of globalization, its benefits and risks, and the future. A key development in studies of the political economy suggests that the ability of a country to integrate or cope with the extending reach of globalization is largely determined by domestic governance. In line with this, the second part of the course focuses on the economic history of Vietnam in the regional and global context and the changing domestic governance of the country from past to present. We pay attention to "alternate histories" of change that underlined the road leading to the *Doi Moi* reforms and Vietnam's re-entry into the global political economy. In the third part of this course, we examine the changing configurations of the global political economy vis-à-vis Vietnam, paying special attention to the immediate regions surrounding Vietnam, namely ASEAN, East Asia (in particular, China), and South Asia. We shall conclude this stand-alone course on the global political economy by examining the status of Vietnam and possible pathways the country might take in the globalized digital present and future.

HASS1030 Scientific Socialism (Politics and Social Change)

2 credits

Pre-requisite: NA

The course is part of the VinCore curriculum of VinUniversity. This course is an ideology course mandated by the Vietnamese Government and it teaches the socialist path of development. It equips students with fundamental knowledge about

socialism, including its birth, the system, its stages of development, its objectives, and understanding the meaning derived from studying about socialism. The approach takes philosophical, economic, and socio-political angles to understand the stages of human societal development, from capitalism to socialism and then capitalism. On that basis, students will be able to further research on advanced topics about scientific socialism.

HASS1041/1042 Ho Chi Minh Ideology (Vietnam: History and Culture II)

2 credits

Pre-requisite: NA

HASS 1041 is one of four courses in the General Education Program forming the ideology/national education component required for higher education curriculum as directed by Vietnam's Ministry of Education & Training, Socialist Republic of Vietnam. This course forms 2 credits out of a total of 12 credits dedicated to this requirement for higher education curriculum. These four courses are written to achieve the primary objective of helping students understand core values of both country and university through objective and critical academic lenses in a global context.

As these courses will be taught in English to students for whom English is mainly a second language at VinUniversity, each course is designed to be delivered in the spirit of content-based language learning approach to help students both develop English language competency (focusing on speaking, listening and reading) and basic understanding of the content. The course has two components: 1. Hồ Chí Minh Thought and 2. Vietnam History and Culture II Extension.

HASS1050 History of the Communist Party (Vietnam: History and Culture I)

2 credits

Pre-requisite: NA

Vietnam History and Culture (I) examines Vietnamese history and cultural production from its mythical origins to the early Nguyễn empire (prehistory - *ca.*1820). We parse this history in three acts: Unit 1 – Prehistory, places, and peoples; Unit 2 – Early Empire (1010-1527); and Unit 3 – Fragmentation (1527 – 1802). Throughout this journey through time, we will pause to consider Vietnamese adaptations, developments, and innovations regarding ideology, religion, and culture.

Ultimately, we engage the former worlds of premodern Vietnam as a foil for understanding of the place and possibilities of the Vietnamese Communist Party today. We seek to accomplish this by grappling big questions. What are history and culture? Who are the Vietnamese? Where should we position Vietnamese in place and time? How has geography, climate, and ecology shaped their lives? What ideas shaped Vietnamese sense of self? How did they outlook on the world direct their responses to crisis and change? What does the past teach us about possibilities for future? By

beholding the past, how can we better understand the Vietnamese Communist Party's history and reflect on its forward trajectories?

VCOR1012A/B: OASIS Orientation, Advising, Skills, Identity & Diversity, and Spirit of Pay it Forward

Non-credit

Pre-requisite: NA

This is a mandatory and non-credit bearing course of the VinCore program. Undergraduate students are required to enroll in this course to fulfill part of the graduation requirements and are expected to complete it by the end of their first-year study. This course provides the essential knowledge, skills and practicum lessons (exercise/sport classes), whereby students are able to develop a suitable approach in attaining a physically, mentally, socially and spiritually healthy lifestyle.

Specifically, this course provides students with the knowledge to make better choices during their daily routines to build a healthy lifestyle. A healthy lifestyle includes physical wellbeing, psychosocial, and spiritual health. Students receive mentorship that guides and shapes their perspective, showcasing the importance of having a well-balanced life. Components of a healthy lifestyle will be discussed as a process and science that allows students to have a greater understanding of what it takes to achieve their goals for overall wellbeing. Nutrition and diet will be taught to dispel the myths about how and what you should eat to achieve desired health results. Having a healthy mind, healthy body, clarity of thought and the ability to effectively process information are key trademarks of a healthy lifestyle.

This course emphasizes practical application of the learned concepts in order to integrate subject matter into students' current daily routines and throughout life. The majority of coursework will be held in different environments and venues in order to expose students to the many varieties of fitness tools and resources to maintain a healthy foundation.

LAW1010 Introduction to Law

 2 credits

Pre-requisites: None

Introduction to law (IL) is an introduction to concepts, role and principles of law as well as major fields of law in society. It provides students with general knowledge of law that will serve as a helpful foundation for understanding how law interacts with other disciplines that they study and pursue in the future. The course covers various aspects from legal theory including notion, nature, sources, rule of law, major legal and government systems, legal profession and comparative legal analysis between different bodies of law, branches of international law as well as different mechanisms

of dispute settlement, either at municipal courts or other international forums worldwide. All the topics combine

legal understanding and practical issues in both the Vietnamese context and a wide diversity of international legal backgrounds to help students gain familiarity with basic concepts of national law and be aware of international fundamental legal standards. Throughout the course, students develop critical analysis and problem solving, work-in-group and presentation skills, research literacy in law through theoretical lectures, case law analysis, individual and team assignments.

IL is among the courses in the General Education Program forming the ideology/national education component required for higher education curriculum as directed by the Ministry of Education & Training, Socialist Republic of Vietnam. This course forms 2 credits. These ideology courses are written to achieve the primary objective of helping students understand core values of both country and university through objective and critical academic lenses in a global context. As these courses will be taught in English to students for whom English is mainly a second language at VinUniversity, each course is designed to be delivered in the spirit of content-based language learning approach to help students develop basic understanding of the content.

3.6.2. BSDS Core Courses

MATH1010 Calculus I

4 credits

Pre-requisites: none

This course teaches techniques of integration, finding areas and volumes by integration, exponential growth, partial fractions, infinite sequences and series, tests of convergence, and power series.

MATH1020 Calculus II

4 credits

Pre-requisites: Calculus I

This course gives an introduction to multivariable calculus. Topics include partial derivatives, double and triple integrals, line and surface integrals, vector fields, Green's theorem, Stokes' theorem, and the divergence theorem.

MATH2050 Linear Algebra

4 credits

Pre-requisites: none

This course teaches linear algebra and its applications. Topics include matrices, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and inner

product spaces; applications include brief introductions to difference equations, Markov chains, and systems of linear ordinary differential equations. This course also includes computer use in solving problems.

MATH2010 Probability and Statistics

4 credits

Pre-requisites: Calculus II

This course teaches random variables, probability distributions, expectation, estimation, testing, experimental design, quality control, and regression. Other topics include density functions, expectation and variance, multidimensional random variables, and important distributions including normal, Poisson, exponential, hypothesis testing, confidence intervals, and point estimation using maximum likelihood, the method of moments, conditional probability and Bayesian reasoning.

MATH4010 Advanced Probability and Statistics

3 credits

Pre-requisites: Probability and Statistics

This course teaches advanced topics in probability and statistics. Topics include random processes, convergence of random processes, Markov Chains, Bayesian statistics, nonlinear regression.

MATH2020 Discrete Mathematics

4 credits

Pre-requisites: None

This course covers notions, techniques and algorithms of discrete mathematics with the special emphasis on sets and proof techniques, functions and relations, number theory, combinatorics, probability, logic, the basics of graph theory and the basics of cryptography.

MATH3010 Optimization

4 credits

Pre-requisites: Linear Algebra, Calculus I

This course offers an introduction to optimization models and their applications, ranging from machine learning and statistics to decision-making and control, with emphasis on numerically tractable problems, such as linear or constrained least-squares optimization. The course covers practical convex optimization.

CECS1011 Introduction to Engineering and Computer Science

2 credits

Pre-requisites: None

This course provides a general introduction to the engineering design process–spanning core topics from problem definition through prototyping and testing, as well as other important considerations such as sustainability, failure analysis, and engineering economics. This course also emphasizes multidisciplinary design via a design project (e.g., design a line following robot) which involves students from different majors of college of engineering and computer science.

COMP1010 Introduction to Programming

4 credits

Pre-requisites: None

This course teaches programming and problem-solving using Python. Emphasizes principles of software development, style, and testing. Topics include procedures and functions, iteration, recursion, arrays and vectors, strings, an operational model of procedure and function calls, algorithms, exceptions, object-oriented programming, and GUIs (graphical user interfaces).

COMP1020 Object-oriented Programming and Data Structures

4 credits

Pre-requisites: Introduction to Programming

This course covers program structure and organization, modular programming, advanced topics in object-oriented programming (abstract data types, polymorphism, interfaces, iterators), collections, basics of graphical user interfaces, recursion, data structures (lists, trees, stacks, queues, heaps, search trees, balanced trees, hash tables, graphs), and basic graph algorithms. Java is the principal programming language.

DATA1010 Introduction to Data Science

4 credits

Prerequisite: Introduction to Programming

This course provides a general introduction to data science and the processes and pipelines used with data science – spanning core topics from data acquisition and management to data exploration and business implementation. In addition, other important considerations are covered such as sustainability, ethics, and entrepreneurial and agile development. This course also emphasizes a

multidisciplinary mindset by introducing several cases studies from different domains and working through a typical project.

COMP3010 Algorithm Design

4 credits

Pre-requisites: Discrete Mathematics, Object-oriented Programming & Data Structures

This course covers four major algorithm design techniques (greedy algorithms, divide and conquer, dynamic programming, and network flow), and algorithmic techniques for intractable problems, including identification of structured special cases, approximation algorithms, and local search heuristics. Applications are drawn from systems and networks, artificial intelligence, computer vision, data mining, and computational biology.

COMP2030 Software Construction

 4 credits

Pre-requisites: Object-oriented Programming & Data Structures

This course covers the topics of abstract data types, abstractions functions, interfaces, revisits recursion and regular expressions and grammars. It deals with parser generators, concurrency, thread safety, programming for sockets and networking, queues and message passing, multithreading, locks and synchronization, map and filter, streams and laziness. The course introduces the area of information and data management and how software can be designed to improve data management. It covers testing, code review, version control, designing specifications, debugging and developing complex graphical user interfaces.

COMP2050 Artificial Intelligence

4 credits

Pre-requisites: Introduction to Programming; Probability and Statistics

This course covers the main areas of artificial intelligence, including symbolic and connectivist approaches to artificial intelligence, state search algorithms and biologically inspired optimization algorithms, Bayesian networks, the use of logic programming and inference algorithms for logical problems. As part of the course, students will learn about various approaches to representing uncertainty, get an introduction to the decision theory, planning and decision making under uncertainty, and learn how to apply various artificial intelligence methods to different problems. The course will consider ethical and societal issues related to artificial intelligence.

COMP3020 Machine Learning

4 credits

Pre-requisites: Linear Algebra, Probability and Statistics, Object-oriented Programming & Data Structures

This course covers the principles and algorithms for turning training data into effective automated predictions. It covers the topics such as representation, over-fitting, regularization, and generalization, clustering, classification, recommender problems, probabilistic modeling, reinforcement learning; and methods such as support vector machines and neural networks/deep learning.

COMP3030 Databases and Database Systems

4 credits

Pre-requisites: Object-oriented Programming & Data Structures

This course gives an introduction to relational and noSQL database systems. The topics covered include the relational model, relational algebra, entity-relationship model, schema design, normal forms, SQL, indexing, sorting, relational operators, query optimization, transactions, concurrency control, recovery, database design, and concepts and algorithms for building database management systems.

COMP3040 Computer Vision

3 credits

Pre-requisites: Machine Learning, Linear Algebra, Object-oriented Programming & Data Structures

This course teaches introduction to computer vision. The goal of computer vision is to compute properties of our world-the 3D shape of an environment, the motion of objects, the names of people or things-through analysis of digital images or videos. The course covers a range of topics, including 3D reconstruction, image segmentaion, object recognition, and vision algorithms fro the Internet, as well as key algorithmic, optimization, and machine learning techniques, such as graph cuts, non-linear least squares, and deep learning. This course emphasizes hands-on experience with computer vision, and several large programming projects.

COMP4010 Data Visualization

3 credits

Pre-requisites: Introduction to programming, Probability & Statistics

This course teaches techniques and algorithms for creating effective visualizations of large datasets and their analytics, based on principles from graphic design, visual art, perceptual psychology and cognitive science. In addition to participating in class

discussions, students will have to complete several short data analysis and visualization design assignments as well as a final project. Data visualisation tools such as Tableau are considered as lab exercises.

COMP4020 Natural Language Processing

3 credits

Pre-requisites: Machine Learning, Object-oriented Programming & Data Structures

This course covers the introduction to natural language processing (NLP), the goal of which is to enable computers to use human languages as input, output, or both. It examines NLP in context of including machine translation, automatic conversational assistants and Internet search. Possible topics include summarization, machine translation, sentiment analysis and information extraction as well as methods for handling the underlying phenomena (e.g., syntactic analysis, word sense disambiguation, discourse analysis, their shortcomings and solutions).

COMP4030 Cybersecurity

3 credits

Pre-requisites: Object-oriented Programming & Data Structures, Discrete Mathematics

This course covers the topics of technical and social understanding of how and why security and privacy matter, how to think adversarially, how (and how not) to design systems and products. Topics include user authentication, cryptography, malware, behavioral economics in security, human factors in security, privacy and anonymity, side channels, decoys and deception, and adversarial modeling. Real-world systems and attacks, including Bitcoin, Stuxnet, retailer breaches, implantable medical devices, and health apps are covered. The course discusses societal and ethical issues in cybersecurity.

COMP4040 Data Mining and Big Data Analytics

3 credits

Pre-requisites: Linear Algebra, Object-oriented Programming & Data Structures, Machine Learning

This course covers the statistical aspects of data mining, the effective analysis of large datasets. It covers the process of building and interpreting various statistical models appropriate to such problems arising in scientific and business applications. Topics include preparing data for data mining and interpreting and representing knowledge from big data analysis. Assignments are done using one or more data mining.

MARK1010 Marketing

3 credits

Prerequisites: None

The course covers:

How customers behave and, in particular, what motivates their purchasing decisions.

The components of an organization's strategic marketing program including how to plan, price, promote, and distribute goods, services, ideas, people, and places.

Marketing's relationship to other departments within the firm and to factors outside the organization, such as the economy, competition, suppliers, and political-legal groups. The application of marketing principles to "for-profit" companies and to "not for profit" businesses.

ENTR3010 Entrepreneurship Perspectives

3 credits

Prerequisites: None

This course is intended to distinguish between entrepreneurship and small business management. Emphasis will be placed on the integration of key management principles from prerequisite courses. A real-world case study will be used as the lens through which students will develop an operational business plan. Readings, videos and other reference materials from practitioners, academics and business leaders will be used to make the class reflective of and relevant to the current business environment.

ACCT2010 Introduction to Financial Accounting

3 credits

Prerequisites: None

Comprehensive introduction to financial accounting concepts and applications. Focuses primarily on recording and communicating financial information for use by external users such as investors, creditors and regulators, and is intended to provide a basic understanding of the accounting cycle, elements of financial statements, Generally Accepted Accounting Principles (GAAP), International Financial Reporting Standards, and financial statement interpretation (IFRS). Topics include accounting for inventory, receivables, depreciation, bonds, equity, and cash flows.

COMM1010 Introduction to Communication

3 credits

Prerequisites: None

This foundational course introduces students to the fundamental concepts and theories of communication. Through discussions, case studies, and practical exercises, students will gain an understanding of the key components of effective communication, including interpersonal, intercultural, and organizational communication.

NURS2220 Health Informatics

3 credits

Prerequisites: None

Health Informatics is a multi-disciplinary field at the intersection of information science, computer science, and health care. The course introduces students to the fundamental concepts of managing and using health information technology. The course covers topics such as electronic health records (EHRs), data privacy and security, and basic data analysis. Students learn how to collect, store, and use health information to improve patient care and support healthcare decision-making. This course provides a foundation for understanding how technology is used in healthcare settings to enhance efficiency and patient outcomes.

COMP3080, COMP3090 Course-related project I and II

Min 1 credit

Pre-requisites: Determined by the course lecturers

Courses for the project: Computer Organization, Algorithm Design, Operating Systems, Artificial Intelligence, Machine Learning, Human-Computer Interaction, Robotics, Cybersecurity and Data Mining and Big Data.

Students work in multidisciplinary teams on a course-related problem guided by the course instructor.

COMP4870 Practice/Internship

Non-credit

Pre-requisites: Students must have completed sophomore year.

The professional structured internship offers students opportunities to apply theoretical knowledge to a real-world work environment and know more about companies that students may be interested in joining after graduation. During the internship, students will have the opportunity to discover and/or confirm their career interests, develop their major knowledge and gain valuable professional skills and connections with industry professionals. Students will complete the program under the guidance and support of a company advisor or Principal Investigator (PI), an industry mentor/ project researcher, and a faculty advisor, who will jointly help

students to create SMART learning outcomes (specific, measurable, achievable, relevant and time-bound).

COMP4890 Graduation Thesis/Capstone

6 credits

Pre-requisites: Practice/Internship; Determined by the advisor

This Capstone course is developed for students in the College of Engineering and Computer Science (CECS) to apply technical knowledge and skills acquired in earlier coursework to a project involving actual designs and experiments. Students are strongly encouraged to work on multidiscipline-major topics to produce an end-to-end solution to a complex real-world problem from industry or academia. The assessment methods are formulated from discussions and agreements between the industry and VinUni in accordance with ABET requirements. More specially, the project involves the development of engineering systems or design alternatives, along with testing the implemented systems. The project should focus on advanced technologies, new applications, and their usefulness and benefits in the development of economy and management. In this course, students work in teams of 3 to 5, with at least one student from the Mechanical Engineering (ME) Program and one from the Electrical Engineering (EE) Program, under the supervision of VinUni faculty instructors. Students are enrolled in Capstone I in the first semester to develop or tailor a project proposal and secure instructor approval. In the following semester, they must take Capstone II to complete the project. Students are expected to be present in person for every meeting of the classes in which they are enrolled. They should be able to deliver their work and contribution to the project and engage in professional dialogues about their project during formal presentations.