VINUNIVERSITY

FRM11. PROGRAM SPECIFICATION

Program name: Bachelor of Science in Data Science

Academic year: 2025–2026

This program specification is designed for prospective students, current students, academic staff, and potential employers. It provides a summary of the programs' main features and expected learning outcomes that a typical student might achieve if he/she takes full advantage of the learning opportunities provided. Detailed information on the teaching and assessment methods, course expected learning outcomes and content can be found in the course specifications through the link at the end of this document. Detailed information on the university's regulations can be found on the website: https://policy.vinuni.edu.vn/.

This program specification is relevant to students entering AY 2025–2026.

Program Director

Dr. Le Duy Dung

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Section A. Admissions/ Management Information

1	Title of program:	Bachelor of Science in Data Science
2	Program code:	7460108
3	Vietnam Qualifications Framework level of award	Bachelor's degree – level 6
4	This program specification is relevant to students entering	AY 2025–2026 (Cohort 6)
5	Awarding institution:	VinUniversity
6	Administrative college:	College of Engineering and Computer Science
7	Website of program:	https://cecs.vinuni.edu.vn/undergraduate/data-science/
8	Final award title:	Bachelor of Science in Data Science
9	Job titles of graduates:	Career prospects in the following fields: Data Analyst; Machine Learning Specialist; Business Intelligence Analyst; Data Visualization Specialist; Data Engineer; Big Data Analyst
10	Competency of program graduates: *(according to the DACUM competency set or national, regional or international professional competency framework)*	*A. General Knowledge* *B. Foundational Knowledge* *C. Professional Knowledge* *D. Professional Skills* *E. General Skills* *F. Attitude*
11	Admission criteria: *(according to the regulations of the Ministry of Education and Training, and of university)*	

Attribute	Key Aspects	Criteria
Ability	Scores, Skills, Accolades, Prizes, Demonstration	Does the student have strong academic potential to be successful in a rigorous, demanding and fast paced program at VinUni? In addition to academics, do they have a remarkable or impressive ability in some other field such as sports, music, art, entrepreneurship, etc.? Is this evident in their prior accomplishments or activities? Do they have a track record of success

				of high performance. During the interview, did they demonstrate that ability in some way?
		Aspiration	Goals, Dreams, Inspirations, Targets, Plans, Role-Models	Does the student have a passion for what they want to study? Do they have a goal in mind? Do they want to have a positive impact on the world? In what way? Is it authentic? Have they demonstrated that they venture outside their comfort zone to reach a little higher, try new and difficult things, take on challenges, not take the easy path?
		Commitment	Resilience, Risk-Taking, Self-Reliability	Does the student challenge himself/herself? Have they participated in competitions, sports? Have they taken challenging courses in high school? Have they shown that they have grit and determination to stick to a goal and work hard at accomplishing it? Did they overcome some adversity to succeed despite challenges?
		Creativity	Problem-Solving, Uniqueness, Communication and Expressiveness	Does the student demonstrate an out of the box thinking? Do they use innovative methods to solve problems or tackle a project? Can they express themselves creatively through different kinds of method or medium?
12	Length of program and mode of study:	***Number of credits**: 120 credits (without Minor)* *135 credits (with Minor)* ***Length of program**: 4 years (full-time)* ***Mode**: face-to-face (campus-based)* ***Start month**: September*		
13	Language of delivery:	English		
14	Graduation requirements:	Achieve the required number of accumulated credits		
15	Transfer to and from other programs, opportunities for	***Transfer policy**: Students are allowed to transfer to another program based on the university regulations.*		

	further education, opportunities to acquire additional professional licenses and certificates:	***Opportunities for further education****: Upon completion of the program, students can pursue post-graduate degrees in programs such as Master's or PhD programs in Data Science, or related areas.* ***Opportunities to acquire additional professional licenses and certificates****: The program allows students to earn professional certificates in order to expand their knowledge; certificates from professional unions or organizations within the industry; certificates from international competitions.*
16	Academic quality assurance:	***Program stakeholders****: the government, employers, experts, alumni, the university, Ministry of Education and Training, lecturers, and students* ***Feedback mechanism****: Document research, DACUM workshops, survey* ***Quality goals****:* ***Objective 1****: Continuously improve the quality assurance system* *1.1. Strengthen the organizational structure of Quality Assurance System of the university* *1.2. Develop professional capabilities of staff within the Quality Assurance System* *1.3. Continue to implement quality assurance policies* *1.4 Develop the university's Internal Evaluation System* ***Objective 2****: Standardize activities based on American Psychological Association and British Psychological Society quality criteria* ***Objective 3****: Register for program-level accreditation based on American Psychological Association and British Psychological Society quality criteria* ***National accreditation at institutional and program level****: N/A* ***International accreditation at institutional level****: FIBAA (2025), QS 5 star (2024)*
17	Program leaders and recruitment support staff:	***Program director: Dr. Le Duy Dung*** ***Email****: dung.ld@vinuni.edu.vn* ***Phone****: +84972624156*

Section B. Detailed program information

18	Internationalization/ globalization	*The BS in Data Science program was developed in collaboration with and validated by Cornell University (USA). The program fulfills the entrance requirements for postgraduate degrees (MA/PhD) of many leading international universities. The core faculty involved in delivering the program have extensive international experience in Asia, Europe, Oceania, and the USA.*
19	Program educational objectives (PEOs)	*Engineering students who graduate from VinUniversity are expected to be well-rounded individuals with specific expert-level knowledge in psychological theory and practice and who align with the values of VinUniversity: (1) Empathy, (2) Exceptional Ability, (3) Creativity, (4) Entrepreneurial Spirit, and (5) Leadership Mindset.*
20	Benchmarking: *(Benchmarked with domestic and international programs, international standards such as AACSB, ABET, NASAD, AHLEI, etc.)*	***International programs**: Cornell University (USA)* ***Domestic universities**: Hanoi University of Science and Technology* ***International accreditation standards:***
21	Program learning outcomes (PLOs): *After successful completion of the program, students are able to:*	

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

Section C. Teaching/learning methods and strategies

22	Educational philosophy of the university:	*VinUniversity graduates for all academic programs are expected to have (1) **E**mpathy, (2) E**x**ceptional Ability, (3) **C**reativity, (4) **E**ntrepreneurial Spirit, and (5) **L**eadership Mindset which enable them to create ideas, services, systems, solutions, and products that can contribute to a better life for people and society. (In short, **EXCEL)**.*
23	Educational philosophy of the faculty/program:	*VinUniversity has made a commitment to conduct all learning activities using the principles of Active Learning. Faculty are expected to prepare learning content and materials in a manner that facilitates effective learner participation in the learning process while ensuring a high level of academic and skill proficiency expected of VinUniversity students. The university does not mandate any Active Learning format, pedagogy, or duration, as long as the teaching method meets the above description.*
24	Teaching and learning paradigm:	*Lectures* *Discussions* *Presentations (group work)* *Practical exercises* *Course project (group work)*

		Graduation project *Internship, field trip* *Research projects*
25	Student assessment:	***Admission assessment****: University admission using AQI, NAQI, and interviews* ***Progress assessment****: In-course assessment methods such as multiple-choice questions and/or written questions; presentations; major assignments; projects; essays, research reports.* ***Exit assessment****: Final-year dissertation*
26	Mechanism to establish and monitor achievement of program outcomes:	*The program assesses students' achievement of PLOs throughout and at the end of their studies using a variety of methods:* ***Assessment through the courses****: the PLOs are transferred into the CLOs of the courses, and students' are assessed on their achievement of the CLOs.* ***Evaluation through internship(s)****: the PLOs are translated into the criteria for assessments during internship(s).* ***Assessment of students' achievement of the PLOs in each academic year****: Based on the number of credits students have obtained; this is done at the end of each academic year.*

27	Program structure and content: *(Block diagram of courses)*

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)

28	Development of program learning outcomes in the constituent courses *(How individual courses contribute to the PLOs and PPC)*

No.	Courses	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
1	Calculus I	I	I	I			I	
2	Calculus II							
3	Linear Algebra	I	I	I				
4	Probability and Statistics							
5	Introduction to Programming				I	I		
6	Introduction to Engineering and Computer Science		I				I	I
7	Introduction to Data Science	I	I	I			R	R
8	Data Science Programming	I		I	I	I		
9	Data Science and Society						M	
10	Object-oriented Programming and Data Structures				I			
11	Databases and Database Systems	R		R				
12	Data Mining and Big Data Analytics	R		R	R			
13	Data Visualization			R		M		
14	Machine Learning			R	R			
15	Artificial Intelligence				R		R	
16	Discrete Mathematics							
17	Software Construction							
18	Advanced Probability and Statistics							
19	Computer Vision							
20	Natural Language Processing							
21	Algorithm Design							
22	Cybersecurity							
23	Optimization							
24	Introduction to Financial Accounting							
25	Marketing							
26	Management Information Systems							
27	Entrepreneurship Perspectives							
28	Introduction to Communication							
29	HealthTech & Innovation							
30	Course-related Project I, II	R	R	R	R	R	R	R
31	Internship							
32	Capstone Design Project	M	M	M	M	M	M	M

29	Sample study plan *(by semester)*

Year 1 – 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**

Year 1 – 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**

Year 1 – Semester 3:

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**

Year 2 – Semester 1:

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**

Year 2 – Semester 2:

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	IDEA10xx	Big Ideas	Ý tưởng lớn	2
6	THINK1010	Critical and Creative Thinking	Tư Duy Sáng Tạo và Phản Biện	2
7	TECH1010	Technology Ethics	Đạo Đức Trong Công Nghệ	2
Total				**17**

Year 3 – Semester 1:

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**

Year 3 – Semester 2: Co-op semester

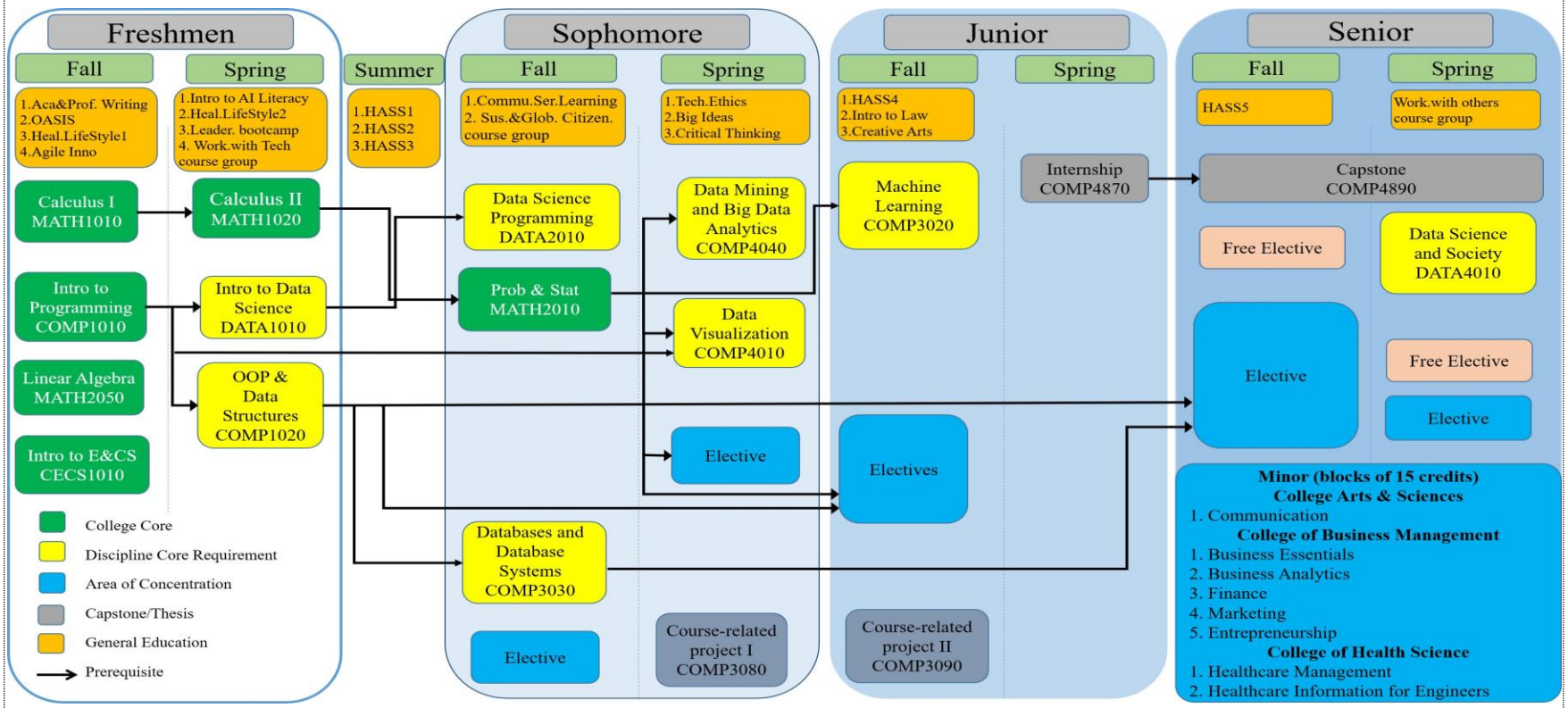
Year 4 – Semester 1:

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**

Year 4 - Semester 2:

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

30	Curriculum learning roadmap: *(the relation and order of courses)*



Section D. Learning environment and student support services

31	Learning environment:	The BS in Data Science program provides a rich and immersive learning environment that bridges academic theory with hands-on experience. Students benefit from access to specialized facilities, real-world placements, and interdisciplinary collaboration. **Research Facilities** The college provides infrastructure and support for student-led research projects, for example, by running a student research grant scheme for which students can apply. Students can also get involved in faculty-led research projects as research assistants. **Field trips and Internships** Many courses organize field trips to various institutions to enhance the learning experience. Structured internships in clinical, educational, organizational, or settings, typically in the 3rd and final year, with reflective supervision and academic integration.
32	Support for students and their learning: *(academic support, pastoral support, and other services)*	The BS in Electrical Engineering program is committed to fostering student success through a comprehensive support system that addresses academic, personal, and professional development needs. **Academic support**

		Faculty Advising: Each student is assigned an academic advisor who provides guidance on course selection, research opportunities, and career planning Research Mentorship: Faculty members mentor students in research design, data analysis, and publication, especially during capstone thesis projects. **Pastoral and Wellbeing Support** Student Counseling Services: Confidential mental health support is available on campus, with counselors trained in student wellbeing and stress management. Peer Support Network: Senior psychology students volunteer as peer mentors to help new students transition into university life. Mindfulness sessions, stress-relief activities, and wellness campaigns are offered throughout the academic year.
33	Student clubs and extracurricular activities available to students:	Career Services: Provides CV writing workshops, mock interviews, and internship placement support specific to psychology-related careers. Student Clubs and Societies: The CECS Student Society organizes academic talks, social events, and community outreach projects to enhance student engagement.

Section E. Approval, publication and update

34	This program specification was published on:	15-08-2025
35	This program specification was last updated on:	15-08-2025