



XIAMEN UNIVERSITY MALAYSIA

廈門大學 馬來西亞分校

PROGRAMME HANDBOOK

BACHELOR OF ENGINEERING IN
DATA SCIENCE (HONOURS)

ACADEMIC SESSION: 2026/09



Academic Affairs Office

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1. UNIVERSITY VISION AND MISSION

Vision

- Xiamen University Malaysia aspires to become a university with a distinct global outlook, featuring first-class teaching and research, and embracing cultural diversity.

Mission

- To nurture young talents with dignity and wisdom, turning them into fine citizens of the region who will contribute to the prosperity of the people and social progress of Malaysia, China and Southeast Asia.

2. PROGRAMME AIMS

The program aims at cultivating talents with a global mindset and strong analytical capabilities in the face of the constantly changing world. The program provides a solid analytical and statistical foundation for students to apply data science knowledge and techniques in solving a wide array of complex data problems. The program caters to the growing market demand for data science graduates in various sectors, including but not limited to banking, commercial, industrial, medical, and public sectors.

3. PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The PEOs are to produce graduates who are:

PEO1

Data scientists who are technically and practically competent in providing solutions for the data science discipline.

PEO2

Data science practitioners who are proficient in communication, adhere to ethical standards, and exhibit professionalism in line with the industry requirements.

PEO3

Data science practitioners who possess leadership, interpersonal skills, and entrepreneurial skills.

PEO4

Data Science practitioners who uphold ethical conduct and professional practices in maintaining integrity.

4. PROGRAMME LEARNING OUTCOMES (PLO)

At the end of the programme, graduates will be able to:

PLO1	Knowledge and Understanding	Analyse data, concepts, principles, and theories related to Data Science.
PLO2	Cognitive Skills	Apply theoretical and technical knowledge to conceptualize, identify, analyse, evaluate and solve data science related problems.
PLO3	Practical Skills	Apply a range of data science methods and data analytical techniques to solve data science-related problems.
PLO4	Interpersonal Skills	Demonstrate effective interaction with domain experts, industry partners, decision-makers, and multidisciplinary teams in the field of Data Science.
PLO5	Communication Skills	Communicate effectively, both orally and in writing, with domain experts, multidisciplinary teams, industry professionals, and other stakeholders in the field of Data Science.
PLO6	Digital Skills	Use digital technology and application software to analyse data and solve problems in the field of data science.
PLO7	Numeracy Skills	Apply numerical skills for problem-solving in the field of data science.
PLO8	Leadership, Autonomy and Responsibility	Demonstrate decision making, teamwork, accountabilities, and leadership in the field of data science.
PLO9	Personal Skills	Exhibit self-development and self-learning capabilities for continuous improvement in data science.
PLO10	Entrepreneurial Skills	Apply entrepreneurial skills and mindset to develop innovative data science solutions.
PLO11	Ethics and Professionalism	Uphold professionalism and ethical practices in the field of Data Science.

5. EXPECTED AREAS OF GRADUATE EMPLOYMENT

Graduates may work as a Data Scientist, Data Engineer, Data Solution Specialist, Data Architect, Data Analyst, Data Mining Specialist, Applications Architect, Analytics Manager, Machine Learning Specialist, Business Intelligence Developer, Statistician, Business Analyst, Market Research Analyst, Analyst Programmer, Database Administrator, Health Informatics Analyst, Data Project Manager, Bioinformatician, Research Analyst, etc.

6. CURRICULUM STRUCTURE

The minimum requirement for graduation will be **143** credits, with all the components meeting the minimum credit values specified in Table 1.

Table 1: Components of the Programme and its Value

	Course Classification	Credit Value	Percentage (%)
1	Compulsory courses/modules*	12	8.4%
2	Core/Major(s)/Specialisation:		
	• Common Core	37	25.9%
	• Major Core	42	29.4%
	• Final Year Project	11	7.7%
3	Optional/elective courses:		
	• Major Elective	19	13.3%
	• General Elective	16	11.2%
4	Minor courses (if applicable)		
5	Industrial training/Practicum	6	4.2%
6	Others (specify):		
	Total Credit Value	143	100.0%

Compulsory Courses

Compulsory Courses refer to Mata Pelajaran Pengajian Umum (MPU), or General Studies, which is a compulsory component of undergraduate education in Malaysia as mandated by the Ministry of Higher Education (MoHE), as shown in Table 2a below.

MPU aims to develop well-rounded graduates by complementing academic studies with broader knowledge, essential skills, ethical values, and social responsibility. Through courses that promote critical thinking, effective communication, integrity, and community engagement, MPU prepares students to become responsible citizens and lifelong learners in an increasingly interconnected world.

Table 2a: Components of the **Compulsory** Courses and its Value

No.	Name of Course	Course Code	Credit Value	International	Malaysian
U1 (3 courses @ 2 credits per course) Philosophy, Values & History Appreciation					
1	Bahasa Melayu Komunikasi 2	MPU1012	2	√	-
2	Integriti dan Antirasuah (Integrity and Anti-Corruption)	MPU1022	2	√	√
3	Aspirasi Negara Bangsa (Malaysian Nation-State Aspiration)	MPU1032	2	-	√
4	Falsafah dan Cabaran Semasa	MPU1042	2	-	√
5	Citra Malaysia (Malaysian Citra)	MPU1052	2	√	-
U2 (1 course @ 2 credits) Soft Skills					
6	Bahasa Kebangsaan A	MPU2012	2	-	1. Fail Bahasa Melayu SPM OR 2. Scored below C/ without credit in Bahasa Melayu SPM
7	Writing for Professional Purposes	MPU2022	2	√	1. Malaysian students with a credit in BM at SPM OR 2. Took and Passed Bahasa Kebangsaan A in diploma level MUST take Writing for Professional Purposes.
U3 (1 course @ 2 credits) Knowledge About Malaysia					
8	Artificial Intelligence and Malaysia's Digital Economy	MPU3012	2	√	√
U4 (1 course @ 2 credits) Practical Course (Community Service, Motivational, Co-curriculum)					
9	Community Service	MPU4012	2	√	√
Total Credit Value (Compulsory Courses)			12		

General Elective Courses

General Elective Courses refer to courses designed to give students options beyond their major-related courses in order to diversify their scope of knowledge.

Students in Science field can choose courses they are interested in from Group I (Arts), Group II (Business) and Group IV (Artificial Intelligence) as shown in Table 2b. Students in Data Science shall achieve at least a total of 16 credits with each group meets the minimum requirement of 1 course.

Table 2b: Components of the **General Elective** Courses and its Value

No.	Name of Course	Course Code	Credit Value	Remarks
Group I (Arts)				
	Group I comprises general elective courses in the field of Arts such as <i>Art Appreciation, Basic Korean Language, and Communication Skills for Job Search.</i>	G01XX/ G1XXX		Minimum 1 course
Group II (Business)				
	Group II comprises general elective courses in the field of Business such as <i>Introduction to Finance, Entrepreneurship and Sustainable Development, and Introduction to International Business</i>	G02XX		Minimum 1 course
Group IV (Artificial Intelligence)				
	Group IV comprises general elective courses in the field of Artificial Intelligence , comprising: • Discipline-based (Compulsory) • General (Optional)	G04XX		Minimum 1 course
Total Credit Value (General Elective Courses)			16	

*Note: The courses listed are provided as examples for reference only. The actual general elective courses offered may vary each semester. Students should refer to the **General Elective Course Library** for the list of general elective courses available in a particular semester.*

Common Core Courses

Common Core Courses refer to essential courses offered for students in different majors but in the same field according to disciplinary development rules.

Table 2c: Components of the **Common Core** courses and its Value

No.	Name of Course	Course Code	Credit Value
1	Calculus I A	BSC121	5
2	Linear Algebra	BSC124	3
3	C and C++ Programming	SOF103	4
4	Calculus II B	BSC130	3
5	Data Structures	CST204	4
6	Python and TensorFlow Programming Language	AIT102	3
7	Database	SOF202	4
8	Statistics	MAT203	4
9	Introduction to Data Science	DSC101	3
10	Probability Theory	MAT107	4
Total Credit Value (Common Core Courses)			37

Major Core Courses

Major Core Courses refer to courses designed to meet the core educational objectives; each major has its own features.

Table 2d: Components of the **Major Core** Courses and its Value

No.	Name of Course	Course Code	Credit Value
1	Computer Networks and Communication	CST309	4
2	Computer Architecture	CST308	4
3	Design and Analysis of Algorithms	CST207	4
4	Applied Machine Learning	AIT201	3
5	Statistical Programming using R	DSC201	4
6	Software Engineering	CST401	4
7	Data Mining	SWE402	3
8	Principles of Operating Systems	CST306	4
9	Big Data Analytics	DSC302	3
10	Methods and Applications of Deep Learning	AIT202	3
11	Advanced Machine Learning	AIT301	3
12	Advanced Data Analysis	AIT403	3
13	Fundamental Research in Academic Project	DSC301	5
14	Data Science Academic Project	DSC401	6
Total Credit Value (Major Core Courses)			53

Table 2e: Components of the **Industrial Training** and its Value

No.	Name of Course	Course Code	Credit Value
1	Industrial Training	DSC402	6
Total Credit Value (Industrial Training)			6

Major Elective Courses

Major Elective Courses refer to courses designed to help students to identify their interested field or direction within the major, which enable them to be better prepared for their career's pathways.

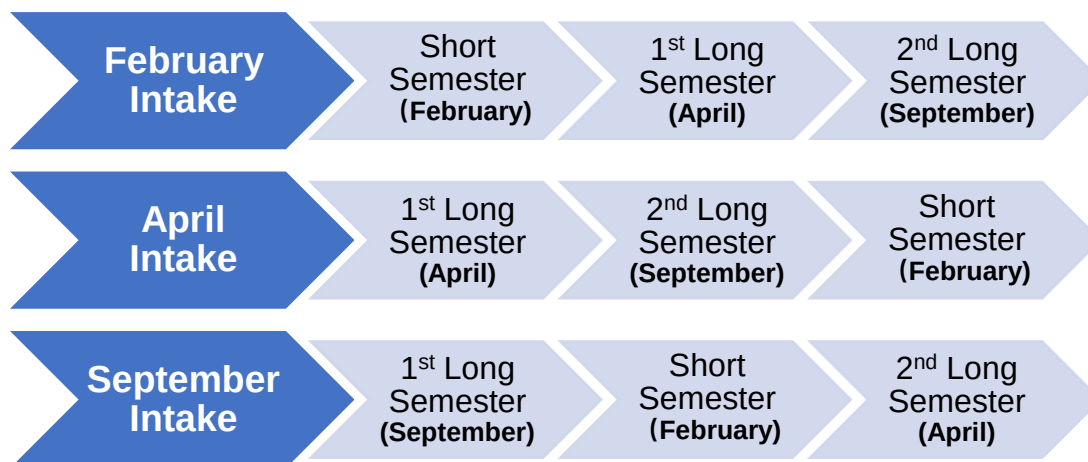
For major elective courses, students are required to choose designated courses based on table below:

Table 2f: Components of the **Major Elective** Courses and its Value

No.	Name of Course	Course Code	Credit Value	Remarks
1	Time Series	MAT315	4	Choose 2 courses (min. 6 credits)
2	Principles of Artificial Intelligence	SOF106	3	
3	Introduction to Intelligence Application	AIT103	3	
4	Object-Oriented Programming-Java	CST210	4	Choose 2 course (min. 7 credits)
5	Introduction to Cloud Computing	SWE309	3	
6	Regression Analysis	MAT314	4	
7	Bayesian Statistics	MAT323	3	Choose 1 course (3 credits)
8	Natural Language Processing	AIT203	3	
9	Statistical Learning	AIT302	3	
10	Multivariate Statistical Analysis	MAT324	3	Choose 1 course (3 credits)
11	Deep Reinforcement Learning and Control	AIT306	3	
12	Computer Graphics	SWE206	3	
Total Credit Value (Major Elective Courses)			19	

7. LIST OF COURSES OFFERED FOR EACH ACADEMIC YEAR

There are three (3) semesters in each academic year: two (2) long semesters and one (1) short semester. The sequence of course registration varies according to the intake:



Students should be aware that the total number of credits shall not exceed **20** for long semester and **7** for a short semester.

It is important to note that the arrangement of courses for each academic year listed below is subject to change based on programme needs or institutional requirements.

Year	Semester	Course Name	Course Code	Classification	Credit
Year 1	1 st Long Semester	Calculus I A	BSC121	Common Core	5
		Linear Algebra	BSC124	Common Core	3
		C and C++ Programming	SOF103	Common Core	4
		Bahasa Melayu Komunikasi 2	MPU1012	Compulsory	2
		Aspirasi Negara Bangsa (Malaysian Nation-State Aspiration)	MPU1032	Compulsory	
		Citra Malaysia (Malaysian Citra)	MPU1052	Compulsory	2
		Falsafah dan Cabaran Semasa	MPU1042	Compulsory	
		Integriti dan Antirasuah (Integrity and Anti-Corruption)	MPU1022	Compulsory	2
		Total Credit Value			18
	2 nd Long Semester	Computer Networks and Communication	CST309	Major Core	4
		Calculus II B	BSC130	Common Core	3
		Data Structures	CST204	Common Core	4
		Introduction to Data Science	DSC101	Common Core	3
		Bahasa Kebangsaan A	MPU2012	Compulsory	2
		Writing for Professional Purposes	MPU2022	Compulsory	2

Year	Semester	Course Name	Course Code	Classification	Credit	
		Artificial Intelligence and Malaysia's Digital Economy	MPU3012	Compulsory	2	
		Total Credit Value				18
	Short Semester	Select from Table 2b	Gxxxx	General Elective	6	
		Total Credit Value				6
Year 2	1 st Long Semester	Python and Tensorflow Programming Language	AIT102	Common Core	3	
		Computer Architecture	CST308	Major Core	4	
		Database	SOF202	Common Core	4	
		Probability Theory	MAT107	Common Core	4	
		Design and Analysis of Algorithms	CST207	Major Core	4	
		Total Credit Value				19
	2 nd Long Semester	Statistics	MAT203	Common Core	4	
		Applied Machine Learning	AIT201	Major Core	3	
		Software Engineering	CST401	Major core	4	
		Student to choose 2 courses (Total min 6 credits):				
		Time Series	MAT315	Major Elective	4	
		Principles of Artificial Intelligence	SOF106	Major Elective	3	
		Introduction to Intelligence Application	AIT103	Major Elective	3	
		Total Credit Value				17
	Short Semester	Select from Table 2b	Gxxxx	General Elective	2	
		Community Service	MPU4012	Compulsory	2	
		Total Credit Value				4
	Year 3	1 st Long Semester	Statistical Programming using R	DSC201	Major Core	4
			Data Mining	SWE402	Major core	3
Methods and Applications of Deep Learning			AIT202	Major core	3	
Student to choose 2 course (Total min 7 credits):						
Object-Oriented Programming-Java			CST210	Major Elective	4	
Introduction to Cloud Computing			SWE309	Major Elective	3	
Bayesian Statistics			MAT323	Major Elective	3	
Regression Analysis			MAT314	Major Elective	4	
Total Credit Value				17		
2 nd Long Semester		Fundamental Research in Academic Project	DSC301	Final Year Project	5	
		Principles of Operating Systems	CST306	Major core	4	
		Big Data Analytics	DSC302	Major core	3	
		Student to choose 1 course (Total 3 credits):				
		Natural Language Processing	AIT203	Major Elective	3	
		Statistical Learning	AIT302	Major Elective	3	
		Multivariate Statistical Analysis	MAT324	Major Elective	3	
		Total Credit Value				15
Short Semester		Select from Table 2b	Gxxxx	General Elective	4	

Year	Semester	Course Name	Course Code	Classification	Credit
		Total Credit Value			4
Year 4	1 st Long Semester	Data Science Academic Project	DSC401	Final Year Project	6
		Advanced Machine Learning	AIT301	Major Core	3
		Advanced Data Analysis	AIT403	Major Core	3
		Student to choose 1 course (Total 3 credits):			
		Deep Reinforcement Learning and Control	AIT306	Major Elective	3
		Computer Graphics	SWE206	Major Elective	3
		Total Credit Value			15
	2 nd Long Semester	Industrial Training	DSC402	Industrial training	6
		Total Credit Value			6
	Short Semester	AI Applications in Science,Technology, and Business	G0402	General Elective	2
		Select from Table 2b	Gxxxx	General Elective	2
		Total Credit Value			4
Grand Total				143	

8. PREREQUISITE COURSES

A prerequisite is a course that must be completed before taking a more advanced course.

Course Code	Course Name	Prerequisites
BSC130	Calculus II B	BSC 121 Calculus I
CST204	Data Structures	SOF103 C and C++ Programming
CST207	Design and Analysis of Algorithms	CST204 Data Structures
CST210	Object-Oriented Programming-Java	SOF103 C and C++ Programming
CST308	Computer Architecture	SOF103 C and C++ Programming CST204 Data Structures
CST309	Computer Networks and Communication	SOF103 C and C++ Programming
MAT107	Probability Theory	BSC 121 Calculus I
MAT203	Statistics	MAT107 Probability Theory
MAT323	Bayesian Statistics	MAT203 Statistics
MAT324	Multivariate Statistical Analysis	MAT203 Statistics MAT314 Regression Analysis
SOF106	Principles of Artificial Intelligence	SOF103 C and C++ Programming CST204 Data Structures
SOF202	Database	CST204 Data Structures
DSC201	Statistical Programming using R	SOF103 C and C++ Programming DSC101 Introduction to Data Science MAT203 Statistics
AIT301	Advanced Machine Learning	AIT202 Methods and Applications of Deep Learning
DSC401	Data Science Academic Project	DSC301 Fundamental Research in Academic Project
DSC402	Industrial Training	- Obtained at least 60% of total credits (86 credits) - CGPA 2.0 and above
AIT202	Methods and Applications of Deep Learning	AIT102 Python and TensorFlow Programming Language
AIT203	Natural Language Processing	AIT102 Python and TensorFlow Programming Language
AIT201	Applied Machine Learning	AIT102 Python and TensorFlow Programming Language
AIT302	Statistical Learning	MAT203 Statistics

IMPORTANT NOTE

Threshold Requirement

A grade threshold refers to the minimum number of marks that a student needs to obtain in a particular component of the course.

Data Science students must obtain a threshold mark of 40 in all assessment components, including the final examination, and an overall mark of 55 or above to pass a core / major / elective course.

Note: The above information is subject to change as new information becomes available in accordance with the guiding standards and requirements set by relevant authorities.