

COURSES AND CURRICULUM OF SCHOOL OF DATA SCIENCE UNDERGRADUATE PROGRAMMES (NORMATIVE 4-YEAR DEGREE)

- BACHELOR OF SCIENCE IN DATA SCIENCE (JS1072)
- BACHELOR OF ENGINEERING IN DATA AND SYSTEMS ENGINEERING (JS1073)

MINIMUM NUMBER OF CREDIT UNITS REQUIRED FOR THE AWARD

Degree Requirements	BSc Data Science (JS1072)	BEng Data and Systems Engineering (JS1073)
Part 1 - Gateway Education requirement	30 credit units	30 credit units
Part 2 - School requirement	18 credit units	18 credit units
Part 3 - Major requirement	54 credit units (Core: 33; Elective: 21)	60 credit units (Core: 51; Elective: 9)
Free electives / Minor (optional)	18 credit units	12 credit units
Minimum number of credit units required for the award *	120 credit units	120 credit units

* Maximum Credit Units: 144 (student may take a minor or opt to take more free electives provided that they have not yet reached the maximum credit limit or maximum period of study permitted.)

PART 1 - GATEWAY EDUCATION REQUIREMENT (30 CREDIT UNITS)

University requirements	No. of credit units
English	
• GE1401 University English	3 credit units
• Discipline-specific English	3 credit units
GE1501 Chinese Civilisation – History and Philosophy	3 credit units
<u>Distributional requirements</u> Area 1: Arts and Humanities Area 2: Study of Societies, Social and Business Organisations Area 3: Science and Technology	12 credit units <i>(At least one course from each of the three areas)</i>
<u>College/School-specified courses</u> MA1508 Calculus CS2311 Computer Programming SDSC1001 Introduction to Data Science	9 credit units
Total	30 credit units

PART 2 - SCHOOL REQUIREMENT (18 CREDIT UNITS)

Course Code	Course Title	Level	Credit Units
MA1503	Linear Algebra with Applications	B1	4
MA2506	Probability and Statistics	B2	4
MA2508	Multi-variable Calculus	B2	4
SDSC2001	Python for Data Science	B2	3
CS3402	Database Systems	B3	3

Bachelor of Science in Data Science (JS1072)

Core Course (33 credit units)

MS2602	Statistical Inference
SDSC2002	Convex Optimization
SDSC2003	Human Contexts and Ethics in Data Science
SDSC2004	Data Visualization
SDSC2005	Introduction to Computational Social Science
CS3273	Data Protection and System Security
CS3334	Data Structures
SDSC3006	Fundamentals of Machine Learning I
SDSC3007	Advanced statistics
SDSC4116	Data Science Capstone

Elective Course (21 credit units)

Students may choose available elective courses from any modules for specialization. To complete the study of one module, students are required to take the module required course (with * mark) AND take at least 4 courses in total in this module. Students must earn at least 12 credit units from B4 level elective courses for graduation.

General Module

CS3201	Computer Networks
CS4186	Computer Vision and Image Processing
CS4296	Cloud Computing
CS4480	Data-Intensive Computing
CS4487	Machine Learning
EE3919	Medical Imaging and Signal Processing
IS2505	E-Business
LT3233	Computational Linguistics
SDSC3002	Data Mining
SDSC3003	Blockchain
SDSC3004	Computational Optimization
SDSC3009	Behavioural Analytics
SDSC3014	Introduction to Sharing Economy
SDSC4001	Foundation of Reinforcement Learning
SDSC4010	Projects in Data Science (research)
SDSC4107	Financial Engineering and Analytics

Artificial Intelligence Module

CS4486	Artificial Intelligence
SDSC3001	Big Data: The Arts and Science of Scaling*
SDSC3015	Knowledge Graph and Cognitive Computing
SDSC3017	Game Theory and Its Application
SDSC4008	Deep Learning
SDSC4009	Data Intelligence in Action
SDSC4016	Fundamentals of Machine Learning II*

Social Media Analytics Module

COM4511	Social Media and Communication
SDSC3010	Digital Trace Analytics
SDSC3011	Social Data Processing and Modelling
SDSC3013	Introduction to Social Media Analytics*
SDSC3016	Social Network Analysis
SDSC4011	Experimental Research for Social Media

Statistical Learning Module

SDSC3005	Computational Statistics
SDSC3105	Bayesian Analysis*
SDSC4019	Stochastic Processes and Applications
SDSC4110	Statistical Design and Analysis of Experiments

BACHELOR OF ENGINEERING IN DATA AND SYSTEMS ENGINEERING (JS1073)

Core Course (51 credit units)

PHY1201 General Physics I
SDSC2002 Convex Optimization
SDSC2004 Data Visualization
SDSC2102 Statistical Methods and Data Analysis
SDSC3002 Data Mining
SDSC3006 Fundamentals of Machine Learning I
SDSC3008 Systems Dynamics and Control
SDSC3020 Engineering Economics
SDSC3060 Operations Research
SDSC3102 Quality Technologies
CS4480 Data-Intensive Computing
SDSC4026 Systems Modelling and Simulation
SDSC4066 Professional Engineering Practice
SDSC4103 Decision Analytics and Risk Management
SDSC4107 Financial Engineering and Analytics
SDSC4116 Data Science Capstone

Elective Course (9 credit units)

Students may choose available elective courses from any categories for further knowledge in the area.

General Electives

CS4286 Internet Security and E-Commerce
Protocols
CS4486 Artificial Intelligence
LT3233 Computational Linguistics
SDSC3003 Blockchain
SDSC4009 Data Intelligence in Action
SDSC4016 Fundamentals of Machine Learning II
SDSC4018 AI in Systematic Trading

Internet of Things

CS3201 Computer Networks
CS3273 Data Protection and System Security
SDSC3014 Introduction to Sharing Economy
SDSC3018 Introduction to Internet of Things
SDSC4021 Advanced Internet of Things

Systems Analytics

SDSC3004 Computational Optimization
SDSC3105 Bayesian Analysis
SDSC4064 Reliability Engineering
SDSC4110 Statistical Design and Analysis of
Experiments

Smart City

SDSC3027 Smart Logistics and Transportation
SDSC4024 Project Management and Analysis
SDSC4051 Facilities and Distribution Management
SDSC4109 Smart Manufacturing and Automation