B.Sc. (Hons) in Data Science and Analytics

Requirements for Cohorts AY2022/23 and after

Levels	Major Requirements	Cumulative Major Units
Level 1000 (4 Units)	Pass: • DSA1101 Introduction to Data Science [1]	4
Level 2000 (32 Units)	Pass: • CS2040 Data Structures and Algorithms [2] • DSA2101 Essential Data Analytics Tools: Data Visualisation • DSA2102 Essential Data Analytics Tools: Numerical Computation • MA2001 Linear Algebra I • MA2002 Calculus • MA2104 Multivariable Calculus ***or*** MA2311 Techniques in Advanced Calculus • ST2131/MA2116 Probability • ST2132 Mathematical Statistics	36
Level 3000 (16 Units)	Pass: • CS3244 Machine Learning • DSA3101 Data Science in Practice • DSA3102 Essential Data Analytics Tools: Convex Optimisation • ST3131 Regression Analysis	52
Level 4000 (8 Units)	Choose **either** Option A or Option B: <u>Option A – Pass **two** courses as follows:</u> • **One** course from DSA421x courses ***or*** DSE4211 / QF4211 Digital Currencies ***or*** DSE4212 / QF4212 Data Science in FinTech • **One** course from DSA426x courses <u>Option B – Pass **one** of the following Honours Project variants (8 Units)</u> • DSA4288 Honours Project in Data Science and Analytics • DSA4288M Honours Project in DSA (Operations Research) • DSA4288S Honours Project in DSA (Statistical Methodology)	60

To graduate with a Major in Data Science and Analytics, a student must have read and passed <u>at least one</u> of the following:
(1) DSA3288 / DSA3288R [3]
(2) DSA4288 / DSA4288x [4]
(3) Any UPIP course [5]
(4) Any NOC Internship course

Students majoring in Data Science and Analytics have the option to pursue **specialisations** in **(A) Operations Research** and/or **(B) Statistical Methodology**.

(A) To be awarded a specialisation in **Operations Research**, a student must pass **(at least) 20 Units** from the following, with **not more than 8 Units in Level 3000 courses**:

Levels	Courses
Level 3000	• MA3227 Numerical Analysis II • MA3252 Linear and Network Optimisation • ST3236/MA3238 Stochastic Processes I
Level 4000	• DSA4288M Honours Project in DSA (Operations Research) (8 Units) • MA4230 Matrix Computation • MA4260 Stochastic Operations Research • MA4268 Mathematics for Visual Data Processing • MA4270 Data Modelling and Computation • ST4238/MA4251 Stochastic Processes II

(B) To be awarded a specialisation in **Statistical Methodology**, a student must pass **(at least) 20 Units** from the following, with **not more than 8 Units in Level 3000 courses**:

Levels	Courses
Level 3000	• ST3232 Design and Analysis of Experiments • ST3239 Survey Methodology • ST3247 Simulation • ST3248 Statistical Learning I
Level 4000	• DSA4288S Honours Project in DSA (Statistical Methodology) (8 Units) • ST4231 Computer Intensive Statistical Methods • ST4234 Bayesian Statistics • ST4248 Statistical Learning II • ST4250 Multivariate Statistical Analysis • ST4253 Applied Time Series Analysis

Notes:
1. DSA1101 will be read in fulfilment of the Data Literacy requirement under the College of Humanities and Sciences (CHS).
2. CS1010S Programming Methodology, the pre-requisite of CS2040, will be read in fulfilment of the Digital Literacy requirement under CHS.
3. UROPS courses cannot be used to fulfil the major requirements; instead, they will be classified under Unrestricted Electives.
4. DSA4288x can be double-counted (up to a maximum of 8 Units) towards major and specialisation requirements.
5. UPIP will count towards graduation requirements under Unrestricted Electives. Students who have passed a FASSIP course before switching to a primary major in Data Science and Analytics would be deemed to have fulfilled this requirement.

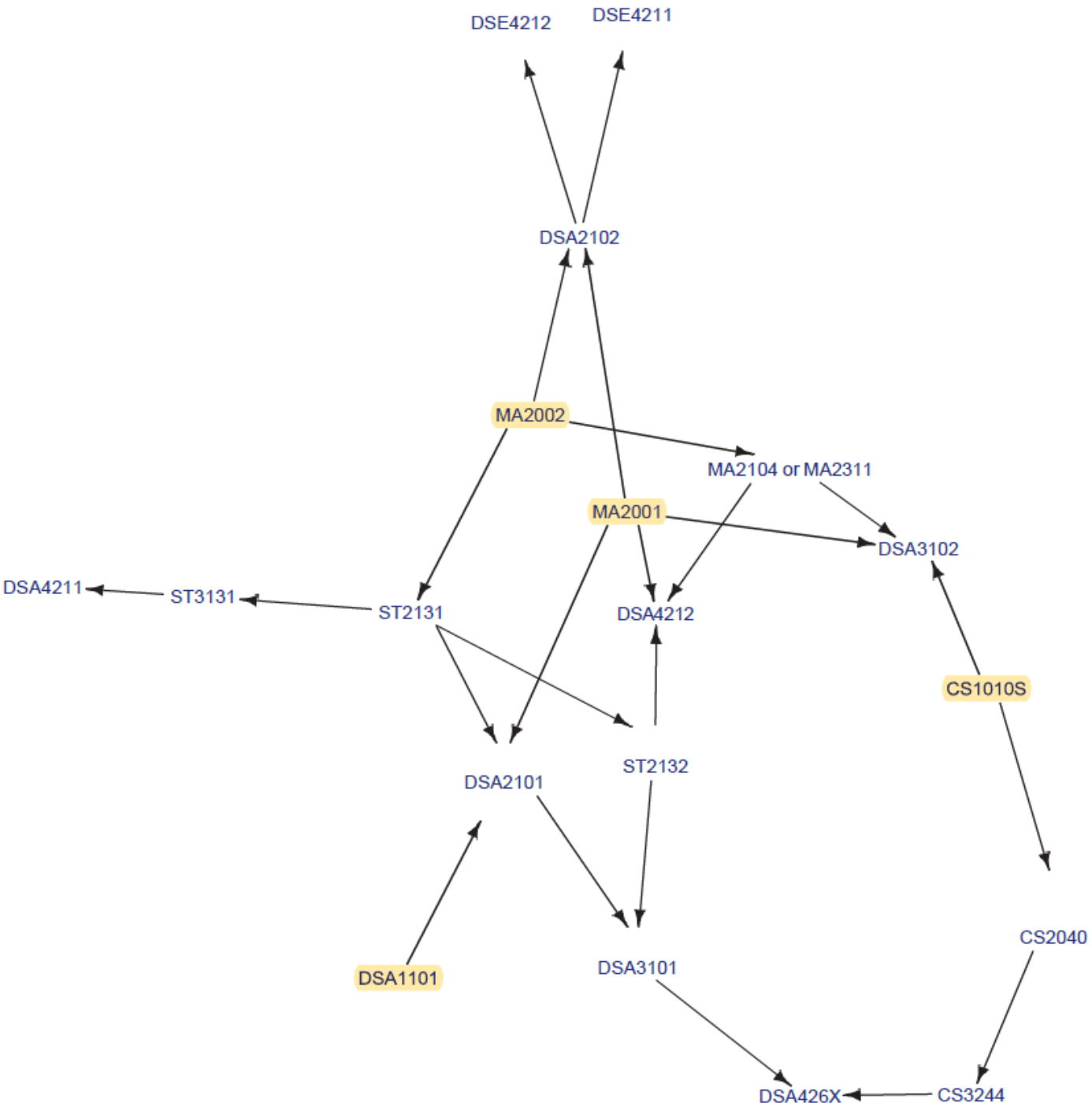
Sample Study Plan – Major in Data Science and Analytics

Year 1		Year 2		Year 3		Year 4	
Sem 1	**Sem 2**	**Sem 1**	**Sem 2**	**Sem 1**	**Sem 2**	**Sem 1**	**Sem 2**
Pair 1: Humanities Pair 2: Social Sciences	Pair 1: Social Sciences Pair 2: Humanities	Writing	Communities and Engagement	Interdisciplinary I	Interdisciplinary II	Major 14	Major 15
Pair 1: Scientific Inquiry I Pair 2: Asian Studies	Pair 1: Asian Studies Pair 2: Scientific Inquiry I	Scientific Inquiry II	Artificial Intelligence	DSA3101 Data Science in Practice or DSA3102	DSA3102 Essential Data Analytics Tools: Convex Optimisation or DSA3101	UE 6	UE 10
Pair 1: Digital Literacy (CS1010S) Pair 2: Design Thinking	Pair 1: Design Thinking Pair 2: Digital Literacy (CS1010S)	MA2311 Techniques in Advanced Calculus/ MA2104 or CS2040	CS2040 Data Structures and Algorithms or MA2104 Multivariable Calculus	CS3244 Machine Learning	UE 3	UE 7	UE 11
Pair 1: MA2001 Linear Algebra I Pair 2: DSA1101*	Pair 1: DSA1101* Introduction to Data Science Pair 2: MA2001	DSA2101 Essential Data Analytics Tools: Data Visualisation or DSA2102	DSA2102 Essential Data Analytics Tools: Numerical Computation or DSA2101	UE 1	UE 4	UE 8	UE 12
MA2002 Calculus	ST2131 Probability	ST2132 Mathematical Statistics or ST3131	ST3131 Regression Analysis or ST2132	UE 2	UE 5	UE 9	UE 13

* DSA1101 fulfils the Data Literacy requirement

The actual pre-allocation of CHS Common Curriculum courses may differ from the sample study plan. For the actual pre-allocation pairings, please refer to the Faculty of Science website here.

Pre-requisite Graph for Major in Data Science and Analytics



Notes on CHS Common Curriculum courses:

Students are strongly encouraged to complete all CHS Common Curriculum courses in their first two years **except** for the following 3 courses:

- ❖ Communities and Engagement course – can be taken from Years 2 to 4*
- ❖ Two Interdisciplinary courses – can be taken in Years 3 and 4

*Important Note on Workload: Semester vs. Year-long C&E courses

- Some C&E courses, usually the field/project-work courses, are regular intense 4-Unit courses with work completed within one semester.

- Other C&E courses, especially the service-work courses, are spread out over two consecutive semesters, or up to one year, that is, **Semester 1 through Semester 2 to Special Term 2**; or **Semester 2 through the Special Terms to Semester 1 of following Academic Year (AY)**. You may click here for more details on the service-work courses.

- For students who read year-long C&E courses which extend till Special Term (during the summer break) after their 8th semester, please note that grades are awarded only at the end of Special Term 2. As a result, the degree will be conferred in late August, and students will participate in the Commencement ceremony in the following academic year, rather than in the same AY as the completion of the course. For more details, please check out the FAQ here.

- As such, students who prefer to take year-long C&E courses instead of semester-long courses (which may have limited capacity each semester) are encouraged to plan ahead by including the C&E course earlier in the study plan, for example, during Year 2 of study.

  This would allow students to plan for other enrichment programmes (such as Student Exchange programmes, NOC and/or UPIP/Internships) during Year 3, rather than deferring this requirement to Year 4. This is especially beneficial as students typically need to devote time for their job search in the final semester while completing their remaining graduation requirements.

- For more enquiries, please check out the FAQ, or email the C&E team at **AskCnE@nus.edu.sg**.