

## Requirements for Major in Data Science and Analytics

Applicable to cohorts AY2021/2022 and after

| Levels                   | Major Requirements   | Cumulative Major Units |
|--------------------------|--|------------------------|
| Level 1000<br>(4 Units)  | Pass<br>- DSA1101 Introduction to Data Science <sup>1</sup>  | 4                      |
| Level 2000<br>(32 Units) | Pass<br>- CS2040 Data Structures and Algorithms <sup>2</sup><br>- DSA2101 Essential Data Analytics Tools: Data Visualisation<br>- DSA2102 Essential Data Analytics Tools: Numerical Computation<br>- MA2001 Linear Algebra I<br>- MA2002 Calculus<br>- MA2311 Techniques in Advanced Calculus<br><b>or</b> MA2104 Multivariable Calculus<br>- ST2131/MA2116/MA2216 Probability<br>- ST2132 Mathematical Statistics   | 36                     |
| Level 3000<br>(16 Units) | Pass<br>- CS3244 Machine Learning<br>- DSA3101 Data Science in Practice<br>- DSA3102 Essential Data Analytics Tools: Convex Optimisation<br>- ST3131 Regression Analysis   | 52                     |
| Level 4000<br>(8 Units)  | Choose either Option A or Option B<br><u>Option A – Pass two courses as follows:</u><br>- One course from DSA42xx courses (except DSA4288 / DSA4288M / DSA4288S)<br><b>or</b> DSE4211 / QF4211 Digital Currencies<br><b>or</b> DSE4212 / QF4212 Data Science in FinTech<br>- One other course from DSA426x courses<br><u>Option B – Pass one of the following Honours Project (8 Units) variants:</u><br>- DSA4288 Honours Project in Data Science and Analytics<br>- DSA4288M Honours Project in DSA (Operations Research)<br>- DSA4288S Honours Project in DSA (Statistical Methodology) | 60                     |

<sup>1</sup> DSA1101 will be read in fulfilment of the Data Literacy requirement under the College of Humanities and Sciences.

<sup>2</sup> CS1010S Programming Methodology, the pre-requisite of CS2040, will be read in fulfilment of the Digital Literacy requirement under the College of Humanities and Sciences.

To graduate with a Major in Data Science and Analytics, student must have read and passed at least one of the following:

- (1) DSA3288 / DSA3288R
- (2) DSA4288 / DSA4288x
- (3) Any UPIP course\*
- (4) Any NOC Internship course

\*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.

\*DSA4288x can be double-counted (up to maximum of 8 Units) towards major and specialisation requirements.

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

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

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

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

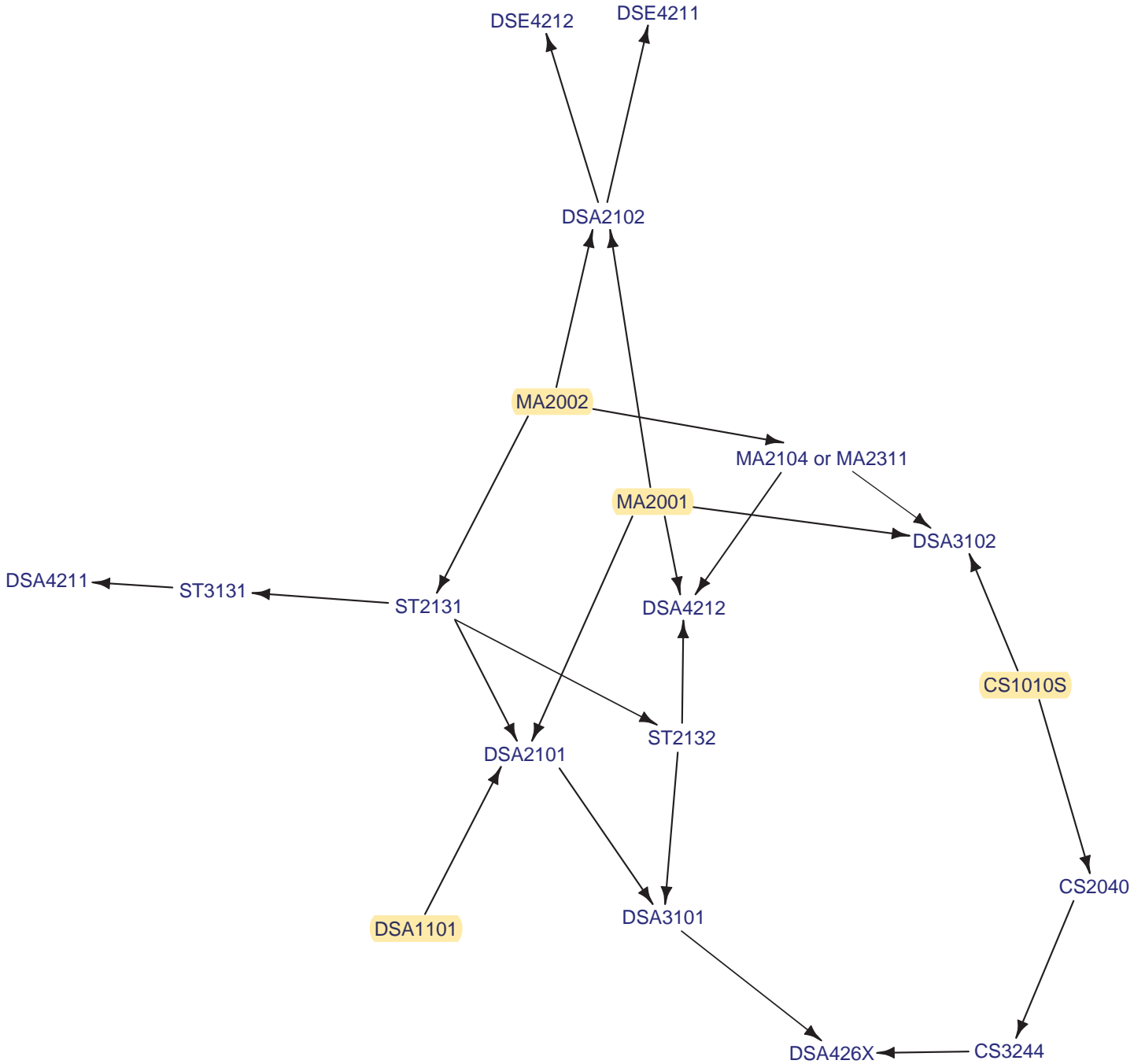
ST3232 Design and Analysis of Experiments  
ST3239 Survey Methodology  
ST3247 Simulation  
ST3248 Statistical Learning I  
ST4231 Computer Intensive Statistical Methods  
ST4234 Bayesian Statistics  
ST4248 Statistical Learning II  
ST4250 Multivariate Statistical Analysis  
ST4253 Applied Time Series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

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

\* DSA1101 fulfils the Data Literacy requirement.

# Pre-requisite Graph for Major in Data Science and Analytics



Note on CHS Common Curriculum courses:

1) 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 those students who read the year-long C&E courses which extend till Special Term (during the summer break) after their 8th semester, please note that grades are awarded at the end of Special Term 2, which means your degree will be conferred in end-Aug, and you will join the Commencement ceremony in the following year instead of the same AY of completion of the course. For more details, please check out the FAQ [here](#).
- As such, students who prefer to take such year-long C&E courses instead of semester-long courses (where the latter might have limited capacity in each semester) are encouraged to plan in advance. You may do so by including the C&E course in your study plan earlier in your candidature; 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 instead of delaying this requirement to Year 4 when students will need to devote time for their job search in the final semester as they complete the remaining graduation requirements.
- For more enquiries, please check out the [FAQ](#), or email the C&E team at [AskCnE@nus.edu.sg](mailto:AskCnE@nus.edu.sg).

2) The actual pre-allocation may differ from the sample study plan. For the actual pre-allocation pairings, please click [here](#).