**National University of Singapore**

**Department of Mathematics & Department of Statistics and Data Sciences**

**GUIDELINES FOR  
DSA4288 Honours Project in Data Science and Analytics /  
DSA4288M Honours Project in DSA (Operations Research) /**

**DSA4288S Honours Project in DSA (Statistical Methodology)**

# Introduction

DSA4288/DSA4288M/DSA4288S serve as options for the graduation requirements for the Data Science and Analytics major, and the DSA specialisations in Operations Research and Statistical Methodology respectively.

Students who wish to read this course must have completed at least 100 units of courses, of which at least 52 units are from the major requirements.

Each student must complete a project constituting 8 units under the supervision of an academic staff. The duration of the project is **one semester**. The course DSA4288/DSA4288M/DSA4288S will be allocated to eligible students upon submission and confirmation of the project details.

# Objectives

The objectives of this course are to allow students to develop skills for independent research in data science and related fields and the application of novel data-driven strategies for solving scientific and business problems. Upon completion of the course, students should be able to demonstrate an appreciation of the current state of knowledge in a particular field of research, master the techniques required for the study of a research question, and communicate research findings clearly and concisely in written and spoken English.

# Format of the Project

A student proposes to work on a project based on their interest. This work is done under the guidance of a supervisor (from Department of Mathematics or Department of Statistics and Data Science) and consists of a systematic study and elaboration of an approved topic. An account of the knowledge gained is given in a thesis.

# Guidelines for the Project

Students are required to solicit project supervision on their own. Once a student has confirmed project supervision with a faculty member, the student should email the details (student name and matric ID, supervisor name, project title) to Ms Faith Wong at faith@nus.edu.sg immediately. Students are expected to confirm and submit the details by the *Friday of Week 1* of the semester.

**Assessment**

There are five components for an individual project. Marks are given by the supervisor. The following weightage applies to the component marks:

1. Honours thesis submission 50%
2. Oral presentation 25%
3. Question & Answer 20%
4. Final submission 5%

1. Progress Presentation(s) (Optional)

At the discretion of the supervisor, the student may be required to make progress presentation(s) to demonstrate his/her understanding of the existing literature relevant to the topic of the project and for the supervisor to provide feedback on his/her presentation skills and ability to answer questions.

1. Honours Thesis Submission

***One softcopy*** of the Honours thesis in PDF format *must* be uploaded into Canvas (instructions in due course) by 4:00 pm on the *Friday of week 12* for an originality check. Supervisors will use the originality report to assess the thesis. Program codes, if any, must also be uploaded into Canvas (instructions in due course). In particular, lengthy program codes should not be reproduced in the thesis.

There are no strict limits on the length of the thesis; on average, it is likely to be about 30-35 pages, excluding front matter (e.g., title page, content page, abstract/summary, list of figures and/or tables, etc.), back matter (e.g., references, appendixes, etc.), figures and/or tables. However, significant variations from the average may occur because of the nature of some projects. In any case, the thesis should not exceed 80 pages in length. The Honours thesis should be typed on A4 size paper (12-pt font, double-spacing, single-sided or double-sided, 1-in margins), with the standard format of the cover page (as shown on the last page).

1. Oral Presentation

The student will also be required to give a 40-minute oral presentation of the work done. It will be assessed by their supervisor.

The oral presentations will be held during *Week 13* (instructions in due course). Each student will be required to attend at least 6 oral presentations.

1. Question & Answer (Q&A)

After his/her oral presentation, the student will have to appear in a Q&A session conducted by the supervisor. The questions will deal with the subject matter of the project.

The Q&A session will last about 30 minutes and will give the student an opportunity to clear up misunderstandings or uncertainties about the material presented in the thesis. The supervisor will give the student a list of matters requiring attention (ranging from typographical to mathematical errors requiring correction) and the student is required to amend the thesis accordingly for final submission.

1. Final Submission

After addressing the matters raised by the supervisor, the student uploads into Canvas (instructions in due course) ***one softcopy*** of the thesis in PDF format by 4:00 pm, *Friday of Reading Week*. It is stressed that this is an important part of the formal requirement, and also will be assessed.

# Report Writing

## Notes and Referencing

Principal original sources of the material for the project should be consulted as far as possible, in addition to accounts that may be found in textbooks or surveys. All sources that have been used should be *explicitly* acknowledged in the thesis/report. The status of the results in the thesis/report, whether they are new and obtained by the student or whether they are obtained by others, should be stated.

## Writing the Summary

The student, in consultation with the supervisor, should prepare a summary of about 300 words on the nature and scope of the thesis/report. The summary should be bound with the thesis/report. It should also contain a statement highlighting the contributions made by the student. The statement should include, if any,

1. *the student’s own ideas, own results, own proof, own interpretations, own applications; own examples or counterexamples, own computer programs which he/she does not obtain from other sources. The relevant parts of the written thesis which contain such contributions should be explicitly stated.*
2. *improvements made by the students on existing theorems, proofs, etc., found in books or papers. The sources from which the results are improved upon should be mentioned explicitly.*

# Pointers for Oral Presentation

## (I) Things to do

*(A) Before the presentation*

* Identify the main results and main ideas in your thesis. Focus on them
* Try to put across a few main ideas to give the “flavour” of your project
* Prepare and organize presentation aids in advance
* Make sure your notation is consistent throughout the presentation
* Draw diagrams, give tables and plots to help bring across the ideas to the audience
* Have a practice presentation with a friend (not your supervisor)
* Time yourself, allowing the audience plenty of time to read each slide*(B) During the presentation*
* Give an outline for the presentation
* Highlight the main results. Give motivation as to why you think they are interesting
* Give some applications and/or connections with other topics you know of
* Speak clearly and maintain eye contact with the audience
* Be enthusiastic about your presentation
* Work out some examples during the presentation to illustrate definitions and theorems
* Make sure the audience can follow the presentation to some extent; be prepared to pause and clarify if the audience looks puzzled
* Use only 35 minutes for presentation and leave some time for questions
* Give a brief summary before concluding the talk

## (II) Things not to do

* Write up a set of notes and read them out loud word for word
* Introduce lots of definitions and notation
* Carry out proofs in full detail
* State a long list of Theorems and Lemmas
* Stand right in front of the overhead projector all the time
* Give excessive details of proofs without the main idea
* Cram everything in the thesis into the presentation
* Go over time
* Rush
* Try to say in 35 minutes everything you have learnt in the semester
* Pretend to know everything

## (III) Reading material on giving effective lecture/talks

* Chapter 3 of *“Handbook on Teaching”* by Daphne Pan et al, printed by NUS
* *“Effective Presentation”* by Pat Levy, Longman
* *“The Art of Lecturing: Some Practical Suggestions”* by Clark and Clark, Cambridge, Heffer
* *“Handbook of Writing for Mathematical Science”* by N.J. Higham, SIAM
* *“How to Write Mathematics”* by P.R. Halmos

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# Title of Thesis/Report

**By**

**Name**

**Supervisor:**

**DSA4288 Honours Project in Data Science and Analytics**

**Department of Statistics and Data Science**

**National University of Singapore**

**2024/2025**