

Expectations and Guidelines for the MMathModel Research Project

The requirements for the Master of Mathematical Modelling include a 45-point research project, taught as ENGSCI 795A and ENGSCI 795B. This document provides a guideline and expectations, in line with the policy set by the Departments of Engineering Science, Mathematics and Physics, for the organisation of the research project and assessment of the associated dissertation.

The dissertation is intended to satisfy the requirement for a research component in the Masters degree. According to the New Zealand Qualifications Authority:

MMathModel graduates will have an advanced level of understanding of the over-arching principles, theory and techniques employed in modelling. They will gain in-depth knowledge and experience in the holistic analysis of mathematical models as well as a critical awareness of how to assess the predictive powers and limitations of mathematical models. Additionally graduates will have experience in applying knowledge to real-world physical problems and communicating the results.

The research project will generally involve reading background material and using this and other acquired knowledge and skills to perform a detailed investigation into a specific research question related to the mathematical modelling of a real-world physical problem. This will likely include modelling and analysis of the model, either in the form of mathematical/computational exploration, or by comparison with experimental data, followed by an explanation or prediction of observable behaviour.

The effort required for successful completion of a dissertation should be comparable with that required for 45 points of lecture courses, i.e., about 10 hours per week in the first and 20 hours per week in the second semester, or about 360 hours in total.

Supervision and project meetings

For each dissertation, a member of the academic staff from the Departments of Engineering Science, Mathematics or Physics will be appointed by the Programme Director as supervisor. Co-supervisors and advisors may also be involved. Supervisors and students are expected to meet regularly, with weekly meetings being recommended.

The student is expected to lead the weekly project meetings with their supervisor. The goal is to use the supervisor's time as efficiently as possible.

- Before the meeting, email the agenda to the supervisor; this is a bullet-point list with topics and questions to be covered.
- After the meeting, email minute notes to the supervisor; these notes should cover major discussion points and next steps for the upcoming week.

Setting an agenda and taking notes are an important part of your personal knowledge management and complement your personal weekly review of your project's progress. Remember, some notes written in the very beginning of the project may come handy when you are writing the dissertation. Consider your notes as *messages to your future-self*. This approach also simulates a typical professional situation, where an analyst reports progress, challenges, questions, and gives feedback to a team lead or customer.

Oral presentations

All students are required to make an oral presentation on their research project. This is usually on a day during the first week of the second semester of enrolment.

The oral presentation does not contribute to the grade awarded for the dissertation, but is regarded as an important component of the student's research education and training. It is expected that supervisors and examiners will be present at these oral presentations. The oral presentation should be about 15 minutes in length, which includes time for questions. The student speakers should include a brief introduction to the field of research and describe the work done so far for their research project.

Elements of a dissertation

A dissertation should not exceed **50 pages** (excluding Appendices). It should include an introduction that gives a context for the subject of the research. It should also include a description of the work undertaken in the research project, including methods used and results obtained. A conclusions section, that relates the work back to the context of the subject and/or describes avenues for further study, should also be provided.

Dissertations should be intelligible to readers with mathematical maturity who are not experts in the field. Dissertations are required to be produced electronically using Word or L^AT_EX or another word-processing package. Links to [L^AT_EX](#) and [Word templates for dissertations](#) are provided on the Mathematics Department website (see www.math.auckland.ac.nz/en/for/current-students/pgdocuments.html).

Every dissertation should contain the following:

1. Title page

The title should be centred in the top third of the title page. The student's name should be centred in the middle third of the title page. Information regarding the degree, subject, university and date should be centred in the lower third of the title page. For instance, a statement such as "A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Mathematical Modelling, University of Auckland, 2022" should be included.

2. Abstract

The abstract should contain a succinct summary (not more than 350 words) of the aim, methods, findings and conclusions of the dissertation.

3. Main text

The dissertation must be divided into a logical scheme that is consistently followed throughout the work. For example, the text may be divided into sections and subsections.

4. Appendices

An optional section is permitted for any additional material that does not fit conveniently into the body of the text (e.g., copies of computer programmes if these are an appropriate part of the presentation of the work).

5. List of references

It is important that citations be consistent in style, although there are various possible acceptable styles. Supervisors can provide more information about a style appropriate for each dissertation.

6. PDF conversion

Dissertations should be exported, converted or compiled into PDF format before submission.

Careful proofreading for grammar, punctuation, spelling and general consistency is essential. A high standard of presentation is very important, and plenty of time should be allowed for this process before submission. In general, time spent on achieving a perfectly word-processed dissertation is unlikely to be rewarded with an increase in marks, but time spent on writing a clear, concise, logical report is likely to be rewarded with a better grade.

Assessment of the dissertation

Assessment of the dissertation is done by an examiner and assessor approved by the Postgraduate Committee. Under normal circumstances, the examiner will be a member of academic staff from the Departments of Engineering Science, Mathematics or Physics, while the assessor may be external to the University. In general, the same assessor will be used for all or subsets of dissertations submitted in the same semester.

The examiner and assessor are each expected to provide a short (1–2 page) report on the dissertation, including and justifying a recommended grade range. The Postgraduate Committee decides the final grade.

Dissertations must be submitted by the **last day of exams** in the semester of enrolment in ENGSCI 795B. An electronic copy of the dissertation in PDF format should be emailed to the Programme Director.

Final grade ranges

A grade in the ‘A’ range will usually require a high quality of presentation and at least one of the following: an original research contribution (either theoretical or experimental); a novel synthesis of existing knowledge; clear evidence of an excellent understanding of advanced material.

Overall grades in the B-range will be awarded to a thesis that is of good quality, but that does not achieve excellence in either knowledge of the subject or originality/interpretation/analysis. Grades in the C-range, or below, will be awarded to a thesis that fails to achieve a high standard for the majority of the criteria. Note that the minimum grade for entry into the University of Auckland PhD programme is B+.

Plagiarism

Unacknowledged copying or plagiarism is not acceptable and is treated as an examination offence. Plagiarism means using the work of others and presenting it as your own without explicitly acknowledging or referencing where it came from. Submitting someone else's unattributed or less than fully attributed work or ideas is not evidence of your own grasp of the material and cannot earn you marks. Further information on **academic integrity and copyright** can be found online (see <https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/academic-integrity-copyright/university-regulations-statutes-guidelines.html>).