

NMSA602: Advanced Topics of the Field

Requirements for students who already passed NMST444

2024/2025

Students enrolled in *NMSA602: Advanced Topics in the Field* who did not pass the course *NMST444: Robust Statistical Methods* in previous years will take a standard final (written and oral) exam during the examination period (*NMSA602: Exams*) to complete *NMSA602* in the winter semester 2024/2025.

Students who already passed *NMST444* in the previous years need to prepare and present a final project to pass the course *NMSA602*. The project's topic can be chosen by the student, but must be closely **related to robust statistical methods**, and must **significantly expand on the theory/practice** covered in the course *NMST444*. The project's topic is recommended to be **consulted with the examiner well before** the end of the semester (the sooner, the better, and ideally in the first half of the semester).

A typical project is expected to cover a book chapter(s) and/or several research papers sharing a common theme. A robust statistical method is expected to be properly introduced, motivated, and explored from both theoretical and practical viewpoints. Its performance should be well understood, and the method should be compared and contrasted with standard statistical methods. The project is not a seminar talk — it is not a presentation of a single paper assigned by the lecturer. Instead, it should show independence and a broad overview expected from a Ph.D. student. It is always expected that the topic includes a theoretical part, and the student is able to understand and replicate the theoretical results, including non-trivial proofs.

A few topics that may be suitable for a final project:

- Robust estimation of multivariate location and scatter,
- Robustness in regression or generalized linear models,
- Robust testing procedures,
- Robust methods in time series analysis,

- More advanced topics in differentiability of statistical functionals,
- Breakdown point and its more advanced theory,
- Statistical distances and their use in robust estimation.

For these topics, some relevant literature can be found **on this link**. Specific references may be consulted during the semester.

The form of the project and its presentation are not given. The presentation may be accompanied by a document and/or supporting working and commented computer codes. These should be sent by email at least one day before the presentation. A blackboard or a computer may be used for the presentation itself. The typical length of the presentation is about 30 minutes.

In case the presentation is considered insufficient, the student will be asked to rework, complete, or amend the project and present again. Depending on the quality of the original presentation, this may mean failing the exam attempt.

The projects will be presented during special sessions announced as **NMSA602: Project presentations** in SIS. Registration for these sessions proceeds as for ordinary exams.

October 21, 2024
Stanislav Nagy