

# Formalization of mathematics and proof assistants (Selected topics in computational mathematics)

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**Course description:** Formalized mathematics is mathematics developed with the aid of a proof assistant – a program that helps build constructions and proofs while simultaneously verifying their formal correctness. In recent years, formalized mathematics has been advancing rapidly and has an increasingly broad user base, not only among computer scientists but also among mathematicians. In this course, we will learn how proof assistants work and how to formalize mathematics with them. The emphasis will be on acquiring practical skills and techniques for formalizing complex mathematical content.

## Literature:

- *Lean and its Mathematical Library*, <https://leanprover-community.github.io>
- Jeremy Avigad et al., *Theorem proving in Lean 4*, [https://leanprover.github.io/theorem\\_proving\\_in\\_lean4/](https://leanprover.github.io/theorem_proving_in_lean4/)
- *Get started with GitHub*, <https://docs.github.com/en/get-started>

**Prerequisites:** The course is suitable for doctoral and advanced masters students. You should have the will to learn and the motivation to use the *Lean 4* proof assistant and the *git* revision control system.

**Assessment:** To pass the course you will complete a class project in formalized mathematics and present the results. You will work as a member of a team.

**Semester:** Winter

**Jezik:** English