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Numerical Analysis
Applied Mathematics

sissa mathLab
innovating with mathematics

Target Audience

» **SISSA PhD Students with little or no background in Numerical Analysis**

» **Laurea Magistrale in Matematica (II year)**

» **Laurea Magistrale in Data Science and Scientific Computing (I year)**

» **Master in High Performance Computing**

Rough program of the course

» **Basics** (basic definitions, stability, convergence, well posedness, etc.)

» **Interpolation** (Lagrange polynomials, Bernstein Polynomials, etc.)

» **Integration** (L2 projections, interpolatory quadrature formulas, Gauss q.f., etc.)

» **Numerical linear algebra** (direct and iterative solvers, least squares, eigenvalues/eigenvectors)

» **Introduction to ODEs** (explicit and implicit methods, a-stability, etc.)

» **Introduction to PDEs** (intro to finite differences, finite elements, etc.)

» **All of the above in PYTHON**

Exam Modality

» **SISSA PhD, LM, DSSC**
(oral + optional python project)
Lasts usually 1 hour per student (or less):

  » **Optional Python Project with deadline one day before the oral exam (REQUIRED for 30/30 cum Laude)**

  » **One open question with time to think (and write) (about 20 min) on one of the main topic of the course**

  » **(optional) discussion of the python project (if done by the student) (usually around 10 min)**

  » **Free questions inspired by answers to open question, or by python project (usually around 20-30 min)**

» **MHPC:**

  » **Mandatory Python Project (with all optional assignments of the project)**

  » **Discussion and evaluation of the python project**

Course Availability

» **Scholarship holders (PhD, LM (4), DSSC(4)):**

  » **live (when teachers are present) and Zoom**

» **Everyone else**

  » **Zoom (https://shorturl.at/cfgC8)**

» **Recording of all lectures:**

  » **https://shorturl.at/mBERZ**

» **Scratch Jupiter notebook**

  » **https://shorturl.at/azMNP**

Timetable

» **Lectures (Prof. Rozza, Prof. Heltai)**

   » **Tuesdays: 16:00 — 18.00 @SISSA A-133**

   » **Thursdays: 11:00 — 13:00 @SISSA A-133**

» **Optional hours
(exercises, possibly live for DSSC/LM/MHPC):**

   » **Thursdays: 14:00 — 16:00 @UNITS - H3 - 3B**