Brief Synopsis of the
CMI standard PDE/FEniCS course

Monday

Theory: introduction to PDEs and variational formulations

Practicum: implementation of the Poisson equation; domain singularities

Tuesday

Theory: one-dimensional case; variational form of Newton's method

Practicum: linear and nonlinear boundary conditions

Wednesday

Theory: parabolic PDEs; Stokes equations; mixed methods

Practicum: implementation of heat equation; mixed methods

Thursday

Theory: Navier-Stokes; Elasticity; Diffusion-advection models

Practicum: hyperelasticity; obstacle problems

Friday

Theory: pitfalls with PDEs and numerical methods; polygonal approximation of curved boundaries

Practicum: eigenvalue problem; PDE constrained optimization; introduction to solvers for complicated linear and nonlinear systems

We introduce students to the use of the following software:

- the dolfin interface to FEniCS,

- domain construction and meshing using mshr,

- ParaView for solution visualization.