Topic suggestions for project works in the course "Sobolev spaces"

1. Characterization of traces of $W^{1,p}(\Omega)$-functions by Besov spaces.

   Taken/Varattu

2. Interior regularity of solutions to elliptic PDE's.

   Taken/Varattu

3. Second-order hyperbolic equations.

   Taken/Varattu

4. Fredholm's alternative, Dirichlet eigenvalues and the spectrum of the Laplacian in bounded smooth domains.

   Taken/Varattu

5. Time dependent Sobolev spaces and the heat equation.

   Taken/Varattu

6. Operator semigroups, Hille-Yosida theorem and hyperbolic equations.

   Taken/Varattu

7. Differentiability of Sobolev functions, Rademacher's theorem and absolute continuity along a.e. line.

8. Maximal functions and Sobolev spaces.

Taken/Varattu

9. Riesz-potentials and Poincare inequalities, including weighted spaces.

   Taken/Varattu

10. Calculus of variations: non-linear elasticity and polyconvex functionals.

    Taken/Varattu

11. Calculus of variations: Harmonic mappings and constrained variational problems.

    Taken/Varattu

12. Maximum principles and elliptic PDE's.

13. Hamilton Jacobi Equations.

    Taken/Varattu

14. Fourier analysis methods in Sobolev spaces, $H^{1/2}$ and the trace theorem.

    Taken/Varattu

15. Sobolev spaces and second order parabolic equations.

16. Nonlinear eigenvalue problems.

    Taken/Varattu