

**MATH 85000**  
**Topic in Partial Differential Equations**  
**FALL 2014**

**Instructor:** Dr. Vukadinovic,

**Time and Location:** Th, 6:30pm - 8:30pm, TBA

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**Office Hours:** TBA

## Overview

The aim of this course is twofold. The first part is aimed at providing an elementary and detailed presentation of harmonic analysis tools and Littlewood-Paley theory. These tools will be used to prove classical inequalities (Sobolev, Gagliardo-Nirenberg and Hardy inequalities) which are some of the basic tools in the theory of linear and nonlinear evolution PDEs. In the second part, we present the theory of linear and nonlinear evolution equations. Special emphases will be given to models arising in fluid mechanics, in particular the incompressible Navier-Stokes equations and Euler equations.

## Requirements

Apart from basic knowledge of real analysis, this course is self-contained. Some elementary knowledge of functional analysis is useful but not necessary. Also, the topics are non-standard, in the sense that they don't include topics traditionally taught in introductory PDE courses (e.g. Laplace and Poisson equations).