UNIVERSITÀ DELLA CALABRIA

DIPARTIMENTO DI **MATEMATICA E INFORMATICA**

27 SEPTEMBER – 1 OCTOBER
Online on Microsoft Teams

PhD IN MATHEMATICS AND COMPUTER SCIENCE

COURSE SCHEDULE
ACADEMIC YEAR 2021/2022

Title: **REGULARITY OF WEAK SOLUTIONS TO $-\Delta u = f$**

Speakers: Dr. Francesco Esposito
Prof. Luigi Montoro

Abstract: The course will be focused on some regularity results for the semilinear ellitpic equation $-\Delta u = f$ in bounded smooth domains. In particular we will provide an introduction to some classical arguments like Sobolev spaces, embedding theorems, weak derivatives, weak solutions and some regularity results in the spirit of the classical Calderón-Zygmund theory for elliptic equations.

Course Program:

- Introduction to weak derivatives; definition of Sobolev spaces and related properties.
- Local and global approximations by smooth functions; the trace operator.
- Sobolev inequalities, embedding theorems and difference quotients.
- Definition of weak solutions to elliptic equations and some existence results.
- Regularity of -Δu=f in bounded smooth domains:
    - Interior regularity;
    - Boundary regularity;
    - Bootstrap argument.

Course Organization:
Monday, 27th September 2021: 10:00 - 13:00
Tuesday, 28th September 2021: 10:00 - 12:00
Wednesday, 29th September 2021: 10:00 - 12:00
Thursday, 30th September 2021: 10:00 - 13:00
Friday, 1st October 2021: 10:00 - 12:00

Microsoft Teams Code: uyb4h3w