



UNIVERSITÀ DEGLI STUDI
DI PERUGIA



CIVIL AND ENVIRONMENTAL ENGINEERING

DOCTORAL PROGRAM



Federico Cluni is Associate Professor at University of Perugia. Since 2011-12 he teaches "Dynamics of structures" course for the Master's Degree in Civil Engineering. F. C. has been member of programs funded by the Italian Ministry of University and Scientific Research (MIUR) on wind engineering and vibrations in civil engineering structures, advanced modeling of new materials and structures, modelling of constitutive laws for traditional and innovative building materials.

During his scientific activity, F. C. has taken into account several topics: analysis and reliability of historical buildings; numerical analysis of masonry walls through the homogenization method; dynamics of cables; development of equivalent beam models for tall buildings under environmental loads (wind and earthquakes); development of techniques for the identification of masonry texture through photographic and thermographic images; modelling on non-local behaviour by means of fractional calculus. Federico Cluni is the author or co-author of numerous technical papers published in scientific journal or in conference proceedings.

Location: Campus of Engineering of University of Perugia
Latitude: 43.118177 Longitude: 12.357942

Timetable: June 16 - July 9, 9:00 - 13:30,
Virtual room on Teams

PYTHON FOR NUMERICAL COMPUTING AND DEVELOPMENT OF SCIENTIFIC APPLICATION

Instructor: Federico Cluni, Associate Professor, University of Perugia

Course Description: The course aims to provide skills for the use of the Python programming language in the scientific field. The students will learn how to use tools dedicated to the management and processing of scientific data. Particular attention will be paid to the acquisition of the skills necessary to share the results of research by means of stand-alone applications or web apps.

Evaluation: Students will be evaluated through the exercises assigned during the course; the exercises consist in applications set up during the course and completed at home.

Module 1 – Tuesday June, 16th 2020 9:30-12:30

Introduction and base functionality: interaction, data types, syntax, exceptions, functions.

Module 2– Thursday June, 18th 2020 9:00-13:30

Advanced functionality: class and object programming, data management, base packages.

Module 3 – Tuesday June, 23th 9:00-13:30

Python for numerical computing: numerical array, linear algebra, MATLAB-like operativity with Numpy/Sympy, time series management with Pandas, plot and visualization with Matplotlib, performance enhancement with Numba.

Module 4 – Friday June, 26th 2020 9:00-13:30

Notebooks for research sharing: creation, interactivity, sharing.

Module 5 – Friday July, 3rd 2020 9:00-13:30

Extendibility and interoperability: Fortran, C++, Excel.

Module 6 – Friday July, 10th 2020 9:00-13:30

GUI creation: base concept for creation of graphic user interface with Tkinter.

Module 7 – Friday July, 17th 2020 9:00-13:30

Web App Development: base concepts for creation of web app with Flask.

Applications developed during the course: ODE solver, FEM code.

