POLITECNICO DI MILANO

Scuola di Dottorato di Ricerca

Dottorato in Ingegneria Strutturale, Sismica e Geotecnica

Course: ELASTIC WAVE PROPAGATION WITH APPLICATIONS TO EARTHQUAKE ENGINEERING

Teacher: Prof. Roberto PAOLUCCI

Year: 2022

Modality: All lessons will be taught online. Link will be provided to registered students.

Registration: see instructions at

https://www.dottorato.polimi.it/en/prospective-phd-candidates/single-courses

Schedule and tentative program:

Data: 03-05-2022	Ora inizio: 14:30 Ora fine: 18:00	N°ore: 3.5	Progressivo ore: 3.5
Subject: Introduction to the Fourier transform and its application to signal analysis and solution of linear systems under dynamic excitation			

Data: 06-05-2022	Ora inizio: 14:30 Ora fine: 18:00	N°ore: 3.5	Progressivo ore: 7
Subject: Introduction to P and S waves. 3D wave equations. Wave velocity. Initial condition problems. Boundary condition problems: rigid and free boundaries.			

Data: 10-05-2022	Ora inizio: 14:30 Ora fine: 18:00	N°ore: 3.5	Progressivo ore: 10.5
Subject: A simple boundary value problem: S-wave motion close to a seismic fault. 1D wave propagation in heterogeneous media. Reflection and transmision coefficients. Transfer function of a layer over a halfspace. Impulse response.			

Data: 13-05-2022	Ora inizio: 14:30 Ora fine: 18:00	N°ore: 3.5	Progressivo ore: 14
Subject: Introduction to seismic wave propagation in linear visco-elastic media. Damping ratio and quality factor. Complex shear modulus abd shear wave velocity. Solution of the 1D wave equation. Decay factor. Site amplification effects in Mexico City. Considerations on the records of the Jalapa building.			

Data: 17-05-2022	Ora inizio: 14:30 Ora fine: 18:00	N°ore: 3.5	Progressivo ore: 17.5
Subject: Introduction to 2D elastic wave propagation. P-SV-SH polarization. Boundary conditions. Example of topography effects for SH propagation in a 90° wedge. Rayleigh and Love waves.			

Data: 24-05-2022	Ora inizio: 14:30 Ora fine: 18:00	N°ore: 3.5	Progressivo ore: 21
Subject: Fundamental solutions in elastodynamics: cases from 1D, 2D and 3D wave propagation.			

Data: 27-05-2022	Ora inizio: 14:30 Ora fine: 18:30	N°ore: 4	Progressivo ore: 25
Subject: Numerical approximation of elastic wave propagation problems. Introduction to finite differences. Stability and grid dispersion. Transparent boundary conditions. Overview of boundary and of spectral elements approaches.			