SUMMER SCHOOL
5th-6th July 2022

7th International course on

Seismic Analysis of Structures using OpenSees

Finite Element-based Framework and Civil Engineering Applications

together with

OPENSEES DAYS EURASIA

2nd EURASIAN CONFERENCE ON OPENSEES
7-8 JULY 2022

AIM OF THE COURSE

OpenSees (Open System for Earthquake Engineering Simulations) is an open-source software mainly conceived for the seismic analysis of structures. The source code is public in order to facilitate its wide diffusion and to be adaptable to the needs of users, who can also modify and extend default libraries in terms of materials, components, and algorithms. The main difficulties that users usually face during their first approach to OpenSees are due to the programming language, which might appear rather complex. Following previous editions, the main goal of this short course is to provide a basic understanding of finite element-based theoretical framework and programming language in OpenSees. Structural engineering and research applications will be also presented.

The **summer school** edition will be held at **Politecnico di Torino** from **July 5 to July 6, 2022**.

ORGANIZATION OF THE COURSE

The course is full-immersion scheduled over 2 days starting from fundamentals to advanced applications. The **Summer School** is organized together with the **2nd Eurasian OpenSees Days Conference** which will be held at Politecnico di Torino 7-8 July 2022. **Summer School participants will have a special discount to attend also the conference.**

The lectures are organized as follows:
- **Theoretical lectures** – Fundamentals about the Finite Element Method.
- **Applicative lectures** – Programming language and model development in OpenSees.
- **Live workshop** – Live exercise using OpenSees.

TARGET AUDIENCE & LANGUAGE

Master students, PhD candidates, post-doctoral fellows, and practitioners. The course will be offered in **English**.

MAIN ORGANIZERS

Fabio di Trapani (Politecnico di Torino), Giuseppe Carlo Marano (Politecnico di Torino), Giorgio Monti (Sapienza University of Rome), Giuseppe Andrea Ferro (Politecnico di Torino), Cristoforo Demartino (Zhejiang University).

SCIENTIFIC COMMITTEE

Giorgio Monti (Sapienza University of Rome, EOS), Giuseppe Carlo Marano (Politecnico di Torino), Camillo Nuti (Roma Tre University), Fabrizio Mollaioli (Sapienza University of Rome), Yan Xiao (Zhejiang University/University of Illinois at Urbana Champaign Institute), Giuseppe Quaranta (Sapienza University of Rome), Fabio Di Trapani (Politecnico di Torino), Giuseppe Andrea Ferro (Politecnico di Torino), Antonio Pio Sberna (Politecnico di Torino), Cristoforo Demartino (Zhejiang University/University of Illinois at Urbana Champaign Institute), Francesco Marmo (University of Naples Federico II), Giovanni Minafò (University of Palermo), Jose Abell (Universidad de los Andes, Chile), Amedeo Flora (University of Basilicata), Luciano Rosati (University of Naples Federico II), Bruno Briseghella (Fuzhou University).

COLLABORATORS

Antonio Pio Sberna, Marco Martino Rosso, Jonathan Melchiorre, Laura Sardone, Stefanos Sotiropoulos

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DATES AND VENUE
July 5, 2022, to July 6, 2022.
Politecnico di Torino
Room 5D, Corso Duca degli Abruzzi, 24, 10129 Torino
Remote attendance is also available.

Official website link: https://eosd2022.weebly.com/summerschool.html
PoliTo Summer Schools WebPage: http://international.polito.it/catalogue/summer_schools
INFO & CONTACTS: openseesdays2022@polito.it

ORGANIZATIONAL SECRETARIAT
AITEF snc Via Thailandia 27 - 00144 Roma P.IVA e Cod. Fiscale 07882751006

REGISTRATION AND FEES
Registration is required on the website https://eosd2022.weebly.com/summerschool.html by **May 20, 2022**.
A discounted fee is offered to those attending both the Summer School and the EOSD 2022 Conference.

Summer School attendance fee	**€ 100**
Summer School + EOSD 2022 Conference (attendance only) fee	**€ 150**

SPEAKERS
- **THEORETICAL LECTURES**
  Emma La Malfa Ribolla (University of Palermo)
  Francesco Marmo (University of Naples Federico II)
- **APPLICATIVE LECTURES**
  Cristoforo Demartino (Zhejiang University/University of Illinois at Urbana Champaign Institute)
  Fabio Di Trapani (Politecnico di Torino)
  Giovanni Minafò (University of Palermo)
  Salvatore Sessa (University of Naples Federico II)
  Jose Abell (Universidad de los Andes, Chile)
  Amedeo Flora (University of Basilicata)

PREVIOUS EDITIONS
- **First edition**
  February 18, 2016 – Roma Tre University, Italy.
  May 20, 2016 – Nanjing Tech University, China.
- **Second edition**
  February 17, 2017 – Roma Tre University, Italy.
  July 3-4, 2017 – Fuzhou University, China.
  July 6-7, 2017 – Nanjing Tech University, China.
- **Third edition**
  March 20, 2018 – University of Naples Federico II, Italy.
  March 27, 2018 – Roma Tre University, Italy.
- **Fourth edition**
  March 10, 17, April 29, 2019 – Fuzhou University, China.
  March 27 to 29, 2019 – Sapienza University of Rome, Italy.
- **Fifth edition**
  January 20-22, 2019 – Politecnico di Torino, Italy.
- **Sixth edition**
  July 19-22, 2021 – University of Palermo, Italy.

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PROGRAM

Day 1. Tuesday, July 5, 2022.

08:30-09:00	Registration	
09:00–09:15	Welcome	G.A. Ferro G.C. Marano G.A. Ferro
09:15–09:30	Framework, aims and scope of the course	C. Demartino
09:30–11:30	**Theoretical lecture:** Fundamentals of the Finite Element Method	E. La Malfa
11:30–13:30	**Applicative lecture**: Introduction to TCL and OpenSees	C. Demartino
13:30–14:30	Lunch break	
14.30-16:30	**Theoretical lecture:** Methods and formulations for nonlinear analysis of reinforced concrete frames	F. Marmo
16:30–18:00	**Applicative lecture:** Non-linear Static analysis of frame structures using OpenSEES: concentrated plasticity approach	F. Di Trapani
18:00–19:30	**Live workshop**: Modelling and analysis of an elastic and non-linear frame structure with OpenSees	

Day 2. Wednesday, July 6, 2022.

09:00–11:00	**Applicative lecture**: Non-linear Static analysis of frame structures using OpenSees: distributed plasticity approach	G. Minafò
11:00–12:00	**Applicative lecture:** Dynamic analysis of frame structures using OpenSees	F. Di Trapani
12:00-13:30	**Applicative lecture:** Dynamic analysis of base isolated structures using OpenSees	A. Flora
13:30–14:30	Lunch break	
14:30–16:00	**Applicative lecture:** OpenSees in Python environment and introduction to modelling of 3D structures	C. Demartino
16.00-17.30	**Applicative lecture:** Adding a new material to OpenSees	S. Sessa
17.30-18.30	**Applicative lecture:** Modelling Soil-Structure interaction	J. Abell
18:30–19:15	**Live workshop**: Dynamic analysis of a non-linear frame structure with OpenSees	
19:15–19:45	Closure and certificate ceremony	G.A. Ferro G.C. Marano

EUROASIAN OPENSEES ASSOCIATION

Eurasian OpenSees (EOS), formerly European OpenSees, is a trans-continental non-profit association of engineers and academics who share the vision of contributing to the development of efficient and effective computational tools for complex engineering analysis and design. EOS was officially founded and registered in 2017.

The transformation from a European based organization to a Eurasian one came due the vast contributions of researchers in Asia to computational structural mechanics and their elaborate and numerous efforts in developing and utilizing OpenSees. EOS aims to bridge the continental gap between the East and West and contribute to global engineering and scientific collaboration. The mission of the organization is to:

- Encourage and promote the principles of structural engineering according to the theories and techniques developed within the framework of international scientific research, with particular but not exclusive reference to the structural calculation framework OpenSees, developed at the University of California, Berkeley;
- Organize, promote and disseminate study and research activities, training, development, design, promotional and publishing initiatives and other initiatives designed to foster exchanges of experience both between members and with other scholars and institutions.
- Develop and offer cutting-edge courses, workshops, seminars, and conferences to enrich the skillsets of researchers and practitioners around the world.

All the students and researchers interested in OpenSees are highly encouraged to become part of the association!

DEPARTMENT OF STRUCTURAL, GEOTECHNICAL AND BUILDING ENGINEERING

The Department of STRUCTURAL, GEOTECHNICAL AND BUILDING ENGINEERING (DISEG) is the point of reference in Politecnico di Torino for the areas of knowledge that study safety issues and the practical and formal planning of constructions, taking into account environmental and human actions and their integration with the natural and built environment, considering their uniqueness and regarding the local community. DISEG promotes, coordinates and manages basic and applied research, training, technology transfer and services to the local community in the fields of structural mechanics, structural engineering, geotechnical engineering, building technology, building production, drawing and representation.

http://www.diseg.polito.it/en/

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FORM PREVIOUS EDITIONS

Rome 2018

Turin 2019

Palermo 2021