



UNIVERSITÀ DI PISA  
**DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE**  
**Dottorato di Ricerca in Ingegneria dell'Informazione**

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Doctoral Course

**“Computer Aided Engineering for (bio)industrial applications”**

Prof. Michele Conti

*Dept. of Civil Engineering and Architecture (DICAr), University of Pavia, Via Ferrata 3, 27100, Italy*  
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**Short Abstract:** The course aims at providing an introduction to the structural finite element modeling as a tool aided to design and analyze industrial applications and device. The course will therefore provide applicative examples with an emphasis to biomedical field, integrating theoretical lessons with hands-on sessions to learn the set up of Computer Aided Engineering (CAE) analysis through its main steps (pre-processing, solving, and post-processing).

**Course Contents in brief.** Each lesson is split in two parts: in the first part, theoretical notes are discussed and illustrated by the applicative examples; in the second part, hands-on session is performed to learn the use of CAE software (Simulia, ABAQUS). The set-up of the project proposed by the student(s) to be delivered as part of the final exam will be discussed as well. The main arguments of the course are:

- Introduction to Finite Element Modeling
- Workflow of Finite Element Analysis
- Elements
- Geometries and Meshing. From CAD to FEM
- Materials
- Analysis procedures
- Contacts

Two illustrative examples of CAE applications will be discussed: 1) Assessing the impact of design on 3D printed bone scaffold; 2) the role of material properties on the cardiovascular stent radial force.

**Total # of hours of lecture:** 20 hours

**References:**

[1] Introduction to finite element method. Ottosen. Pearson Education (US)

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## CV of the Teacher

Michele Conti is currently associate professor of industrial bioengineering in the Department of Civil Engineering and Architecture (DICAr) at University of Pavia (Pavia, IT). His main research interests are the design of cardiovascular devices, cardiovascular biomechanics, and bioprinting (see attachment).

**Final Exam:** Discussion of a project proposed by the student and developed using the tools proposed in the course.

## Room and Schedule

Room: *Aula Riunioni del Dipartimento di Ingegneria dell'Informazione, Via G. Caruso 16, Pisa – Ground Floor, Aula Riunioni del Dipartimento di Ingegneria dell'Informazione piano 6, Largo Lucio Lazzarino 1, Pisa*

Schedule:

1. **22/02/2023: 14:00 - 18:00** – Aula Riunioni piano Terra via Caruso
2. **23/02/2023: 9:00 - 13:00** – **Aula Riunioni piano 6 Largo Lucio Lazzarino**
3. **24/02/2023: 9:00 - 13:00** – **Aula Riunioni piano 6 Largo Lucio Lazzarino**
4. **27/02/2023: 9:00 - 13:00** – Aula Riunioni piano Terra via Caruso
5. **28/02/2023: 9:00 - 13:00** – Aula Riunioni piano Terra via Caruso