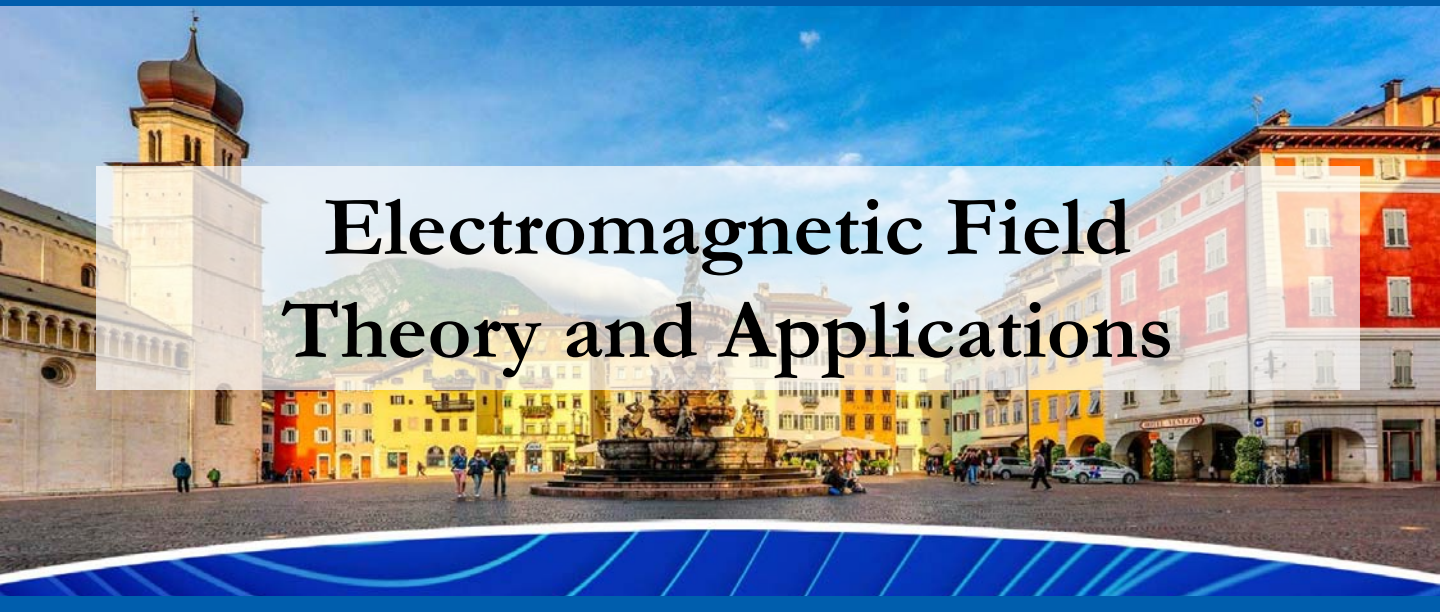
2024 ELEDIA@ICAM PhD Summer Schools



Electromagnetic Field Theory and Applications

Understanding electromagnetic (EM) phenomena is essential for various applications in modern technology, from telecommunications to radar and sensing systems, among others. EM theory forms the backbone of numerous engineering disciplines, guiding the design and operation of devices such as antennas and communication systems.

The course will provide fundamental concepts and theories and apply their understanding to solve practical problems. From Maxwell's equations to EM wave propagation, participants will gain a deep insight into the underlying principles governing EM phenomena and their diverse applications. Applicative examples including software exercises will corroborate the theoretical concepts.

Course Topics

- Maxwell's equations;
- Interface conditions;
- Constitutive relations;
- Radiation conditions;
- Energy theorems;
- Elementary solutions of Maxwell's equations;
- Plane waves;
- Emerging trends in electromagnetic field applications and future directions.

Teaching Activities

- Theoretical Lessons
- e-Xam Self Assessment (each teaching class or periodically)
- MATLAB Hands-On
- e-Xam Final Assessment

Lecturers

- Prof. MASSA Andrea (https://www.eledia.org/eledia-unitn/people/massa-andrea)
- Prof. ROCCA Paolo (https://www.eledia.org/eledia-unitn/people/rocca-paolo)
- Dr. SALUCCI Marco (https://www.eledia.org/eledia-unitn/people/salucci-marco)

References

[1] G. Franceschetti, "Electromagnetics. Theory, Techniques, and Engineering Paradigms", Ed: Kluwer Academic/Plenum Publishers, 1997.

[2] G. Conciauro, "Introduzione alle onde elettromagnetiche", Ed: Mc-Graw-Hill, 1993.

[3] J. Stratton, "Electromagnetic Theory", Ed. McGraw-Hill, 1941.

[4] F. Morichetti and A. Melloni, "Mezzi di trasmissione per l'informazione", Ed: Independently Published, 2018.

[5] F. Morichetti and A. Melloni, "Mezzi di trasmissione per l'informazione: Esercizi svolti", Ed: Independently Published, 2018.

Dates: 02 - 06 September, 2024

Location

- *In presence*: Polo di Mesiano, Via Mesiano 77, 38123 Trento, Italy
- *Online*: Zoom Platform (video registrations will be available for 2 weeks after the event)

Lessons

- 32 h total (including exam – not mandatory)
- 12 h hands-on (in Matlab)

Prerequisites: Basics of Maths

ECTS: 4

Registration Fees (*)

- Free for UniTN Students
- 20 Euro - online attendance
- 40 Euro - in presence attendance

Registration is mandatory

Course Coordination

- Prof. MASSA Andrea

Further Information

- summer-schools@eledia.org

(*) The fees include the course teaching and the slides/material

Register at: https://edu.eledia.org/courses/phd-school-2024-electromagnetic-fields

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