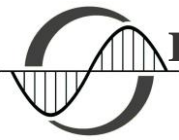




UNIVERSITÀ  
degli STUDI  
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA  
“ETTORE MAJORANA”

DOTTORATO DI RICERCA IN SCIENZA DEI MATERIALI  
E NANOTECNOLOGIE-CICLO XXXIX  
ANNO ACCADEMICO 2023/2024

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## TITLE

Scanning Probe Microscopies

3 CFU

### Teaching staff

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**Reception hours:** Monday 15:00-17:00, Wednesday 15:00-17:00

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### Program of the course:

- 1) Scanning Probe Microscopies: the local probe approach, basic principles, operation modes, experimental set-up, design and instrumentations, historical overview and role in nanotechnology
- 2) Scanning Probe Microscopies typologies: scanning tunneling microscopy, atomic force microscopy, conductive atomic force microscopy, magnetic force microscopy, Kelvin probe microscopy.
- 3) Images acquisition and analysis with scanning probe microscopies: images acquisition, images manipulation, artifacts, images analysis.

4) Applications of scanning probe microscopies to the analysis of nanostructured metallic, insulating, semiconducting surfaces.

5) Nanofabrication using scanning probe microscopy: atomic scale manipulation of matter, local anodic oxidation, nanolithography.

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## **Bibliography:**

1. K. S. Birdi, "Scanning Probe Microscopies: Applications in Science and Technology", CRC Press, 2003.
  2. E. Meyer, H. Hug, R. Bennewitz, "Scanning Probe Microscopy: the Lab on a Tip", Springer-Verlag, 2003.
  3. R. Wiesendanger, "Scanning Probe Microscopy and Spectroscopy: Methods and Applications", Cambridge University Press, 1995.
  4. D. Sarid, "Scanning Force Microscopy: with Applications to Electric, Magnetic, and Atomic Forces", Oxford University Press, 1994.
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