

# X-ray Diffraction

applied to the study of polycrystalline materials

Prof. Paolo Scardi





# X-ray Diffraction 4.5 Credits

## XRD (Part 1, 2 credits)

- basic elements of diffraction: theory and applications
- introduction to laboratory practices

## XRD (Part 2, 2.5 credits) - Applications

- line profile analysis of nanocrystalline and heavily deformed materials  
*or*
- phase identification & chemical analysis  
*or*
- residual stress and texture in mechanical components



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## Part 1 course timetable

Monday	Tuesday	Wednesday	Thursday	Friday
			02.05	03.05
			9.00 - 11.00	9.00 - 13.00
06.05 (*)	07.05	08.05 (*)	09.05	10.05 (*)
9.00 - 13.00		9.00 - 13.00		9.00 - 13.00
20.05	21.05	22.05	23.05	24.05

(\*) to be confirmed

See also: <https://www.unitn.it/dricam/945/x-ray-diffraction-applied-study-polycrystalline-materials-theory-and-practice>  
An examination session will be held at the end of Part 1 (on: **date to be determined**), in the form of written multi-answer questions.



# X-ray Diffraction

## Textbooks, books for reference and preliminary readings

- B.D. Cullity, Elements of X-Ray Diffraction, 1978
- R. Guinebretiere, X-Ray diffraction by polycrystalline materials, 2013
- B.E. Warren, X-ray Diffraction, 1990
- J.F. James, A Student's Guide to Fourier Transforms- With Applications in Physics and Engineering, 2011
- C. Kittel, Introduction to Solid State Physics, 2004



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## Programme

### Part I

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- Introduction to powder diffraction and main applications
- Elements of crystallography
- The reciprocal lattice
- Diffraction: theoretical elements