

# ICTP DIPLOMA PROGRAMME IN EARTH SYSTEM PHYSICS 2014-15

## SYLLABUS

### **SPACE GEODESY AND InSAR\_ - {12 Lectures = 18 hours} A. Borghi**

1. Fundamentals of Geodesy
  - Definition of the Earth gravity field.
  - Reference surfaces: geoid and ellipsoid.
2. Fundamentals of Space Geodesy
  - Definition of Space Geodesy
  - Definition of global and local coordinate systems
  - Description of the satellite motions
  - Forces acting on the satellites
3. GPS observables
  - Pseudo ranges
  - Carrier phases
  - RINEX format
4. Errors in the GPS observables
  - ionosphere
  - troposphere
  - multipath
  - phase center variation
5. Mathematical model of GPS observables
  - relative and absolute positioning
  - linear combination of observables
6. Methods of processing GPS data
  - Commercial software
  - Scientific software
7. GPS Time series analysis
  - Deterministic model
  - Stochastic model

## 8. Kinematic applications

- DGPS
- NRTK

## 9. SAR

- Definition of RADAR
- Definition of SAR
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## 10. Interferometry

- Definition of InSAR
- phase unwrapping
- applications

## 11. DinSAR

- Definition of DinSAR
- applications

## 12. GPS and InSAR geophysical applications

- case studies