Institute for Technologies Applied to Cultural Heritage ITABC - Course 3c

Course Director: Paolo Salonia

Masters' Degree required: Physics, Geology, Chemistry, Cultural Heritage Preservation Sciences, Architecture (with specialization in Restoration, History of Urban planning), Archeology, Ancient Sciences Literary-Philological and historical- artistic, Historic Sciences

The training period offered by CNR ITABC is addressed to early carrier researchers and experts with a background in Science and Humanities. It covers various integrated fields.

- **Geophysical methods and techniques**. It aims at verifying, through the use of appropriate technologies, the characteristics of specific geographic areas and landscapes, such as location of ancient settlements. It also include the development of integrated approaches of high-resolution geophysical methods (differential and magnometrial GPR) relevant for the analysis and enhancement of archaeological sites in urban and suburban areas. This activity aims at defining the most appropriate acquisition techniques, at different scales, of multidimensional modeling, of data representation and management referred to areas which may contain archaeological sites and historic buildings. The various sciences and techniques (remote sensing, high resolution geophysical techniques, geology , topography, archaeology) are applied in situ all together with the goal of obtaining information on spaces and volumes.

- **Reality-based acquisition methods and techniques**, processing and modeling of morphometric data, descriptive data processing and integration of heterogeneous databases used to understand the knowledge of artifacts geometry and conservation. This approach is applied to any method and technology used to characterize in 3D, relevant artifacts morphometry and radiometry. A further Integrated Information System is than adopted to monitor built heritage of the territory, mapping on the 3D artifacts geometry, all relevant heterogeneous data.

- **Virtual Reality methods and techniques** for the reconstruction of archaeological landscapes and for the creation of immersive interactive environments and Virtual Museums. Tools (with particular reference to Open Source) and methods will be described and tested in relevant use cases. On Site and On Line interactive 3d applications will be specifically the focus of this course.

- The course will therefore be divided into three main areas that will be developed both theoretically and in terms of technical application. The theoretical section will be divided roughly into the following modules:

    1. Module **Geophysics** (40 h)
        - Evaluation of integration approaches through analysis of available literature and experiences developed ad hoc.
        - General information of research aspects at national and international level, with respect to both the latest scientific developments and relevant laws.
        - Analysis of the potentialities of the expected results.
        - Evaluation of potential applications in the Mediterranean countries

    2. Module **Survey and 3D Modeling** (40 h)
        - Study of the artifact and analysis of its conservation
        - Instrumental morphometric data acquisition systems
        - Multi-scale photo-scanning systems and UAVs
        - Image-processing
        - GIS for monitoring

3. Module **Virtual Heritage** (40 h)

- Virtual Heritage techniques through Open Source tools
- Data post-processing from 3D acquisition
- Basics about photography applied to Cultural Heritage
- Basics of digital mapping and GIS
- Basics and methods of virtual museums, webGIS, multimedia communication applied to Cultural Heritage

The practical section includes modules:

4. **Laboratory activities** (600 hours)

   Laboratory work is focused on the application of the theory and methodology in the 3 domains, including field work activities, use of specific instruments and software.

For more info please visit: http://www.itabc.cnr.it