

**Course offered for the PhD program  
in Civil, Chemical and Environmental Engineering  
Curriculum in Structural and Geotechnical Engineering, Mechanics and Materials  
a.a. 2021/2022 (XXXVII ciclo)**

(course is open for participation of students from other PhD cycles or programs)

**1. Title**

EXPERIMENTAL TESTING OF MATERIALS AND STRUCTURES.

**2. Course Description**

General issues

Testing materials and structures. What is the strength of a material? Directly measured and derived quantities. Control schemes of a test: force and displacement control, Calibration of a test. Reduced scale testing. The concept of precision. Error theory (basics).

Equipment

Load and Displacement sensors. Data acquisition. Universal testing machines.

Material testing -Concrete

Fresh concrete (in situ tests). Hardened concrete (from 3 days to 12 months). Existing structures: NDTs and MDTs. Combined methods. Other tests/methods (thermography). Critical discussion of the procedures. Case study.

Material testing -Masonry

NDTs: sonic tests, rebound hammer, georadar. MDTs: flat jacks, core drilling, endoscope. Compression tests (axial) of brickwork. Diagonal compression test: in situ and in Lab tests. Case study.

Structure testing – Static tests

Aims and scope. Experimental setup. Technology. Designing the test. Data processing. Load tests on slabs. Theoretical estimation of the displacements. Acceptable-vs-failed tests. Load tests on bridges. Case study.

Structure testing – Dynamic tests

Aims and scope. Experimental setup. Electric measures: sampling and aliasing. Technology. Designing the test. Data processing. Case study.

**3. Course Organization**

The course is hold in English by means of theoretical lessons in class 2.5 hours long/each. Students may access the facilities that are discussed in the course and may use them in the Laboratory. If possible, they will take part in some identification campaign that is periodically performed by the Laboratory.

**4. Teacher**

Prof. Antonio Brencich

**5. Duration and credits**

30 hours, 6 credits

**6. Activation mode and teaching period**

The course will be offered in June/July 2022. Students are requested to register through a mail message to: [brencich@dicca.unige.it](mailto:brencich@dicca.unige.it)

**7. Deadline for registration**

Beginning of the course

**8. Final exam**

Oral only, in the date requested by the student.