

# POSMAT I Programa de Pós-graduação em Engenharia de Materiais



**Course:** Materials Testing

**Code:** MEM.002

**Credits:** 03

**Module:** General formation

## **Contents:**

Fundamentals of mechanical tests: stresses, deformations. Elasticity and Plasticity. Introduction to NDT and DT. Visual inspection techniques, testing with penetrating liquids, testing with magnetic particles, testing for eddy currents, testing by ultrasound, radiographic testing and gammagraphy. Destructive mechanical tests: tensile test, compression test, hardness test, impact test, bending test, torsion test, fatigue test, creep test and relaxation test. Elementary crack propagation mechanisms; phenomenological aspects, models and numerical approach. Performance and failure analysis. Materials and their properties: types of properties; property maps. Practical analysis of materials in the testing laboratory. Methods for evaluating the mechanical properties of materials: strain gauge and standardized mechanical tests.

## **References:**

1. ANDERSON, T. L. **Fracture mechanics: fundamentals and applications**. 3rd Edition. CRC Press, 2004.
2. BORESI, A. P.; SCHMIDT, R. J. **Advanced mechanics of materials**. 6th Edition. John Wiley & Sons, 2002
3. CHEN, W.F.; HAN, D.J. **Plasticity for structural engineers**. New York: Springer-Verlag, 1998.