
Mechanical behaviour of materials

Finalità

Models of the mechanical behaviour of materials will be presented and discussed, with emphasis on metals, polymers, and composites. Methodologies for the evaluation of mechanical properties will be also given.

Programma

Experimental data analysis. Statistics: definitions, normal, log-normal and di Weibull distributions, application to experimental data.

Metals. Engineering and true stress and strain, models of tensile stress-strain behaviour. Ductile failure micromechanisms, micromechanical models.

Polymers: viscoelasticity and related models, temperature-time behaviour, master curves.

Composites: classification e definitions, reinforcements and matrices. Polymer matrix composites: lamination theory, strength and failure criteria, damage; design criteria and applications.

Attività d'esercitazione

Laboratory mechanical tests.

Modalità d'esame

Written, plus presentation and discussion of a laboratory work

Propedeuticità

Scienza delle costruzioni, Costruzione di macchine e Tecnologia meccanica .

Testi consigliati

Teacher notes. Further informations can be found in the following books available at the Engineering Faculty bibliotheque.

L. VERGANI: "Meccanica dei Materiali, McGraw-Hill, I, 2001.

S.R. SWANSON: " Introduction to design and analysis with advanced composite materials ", Prentice-Hall, 1997.