

AEROSPACE ENGINEERING (LM52)

(Brindisi - Università degli Studi)

Insegnamento CERTIFICATION OF AEROSPACE STRUCTURES

GenCod A006200

Insegnamento CERTIFICATION OF AEROSPACE STRUCTURES

Insegnamento in inglese CERTIFICATION OF AEROSPACE

Settore disciplinare ING-IND/04

Corso di studi di riferimento AEROSPACE ENGINEERING

Tipo corso di studi Laurea Magistrale

Crediti 6.0

Ripartizione oraria Ore Attività frontale: 54.0

Per immatricolati nel 2020/2021

Erogato nel 2020/2021

Anno di corso 1

Lingua INGLESE

Percorso CURRICULUM AEROSPACE SYSTEMS

Docente Carmine PAPPALETTERE

Sede Brindisi

Periodo Primo Semestre

Tipo esame Orale

Valutazione Voto Finale

Orario dell'insegnamento

<https://easyroom.unisalento.it/Orario>

BREVE DESCRIZIONE DEL CORSO

The course proposes an experimental approach to the study of the mechanical characteristics of materials and to the measurements of strains and stresses in mechanical components with particular attention to aerospace structures; the principal techniques and standard for the certification of traditional and innovative materials and structures for aeronautical uses will be examined.

PREREQUISITI

Basic knowledge of solid mechanics and design of aerospace structures

OBIETTIVI FORMATIVI

At the end of the course the student must know:

- main European and American standard;
 - main experimental methods for the evaluation of material characteristics of aerospace materials;
 - main experimental methods for measuring displacements, strain and stresses on aerospace components;
 - main experimental techniques for non-destructive testing of aerospace structures.

METODI DIDATTICI

In addition to traditional class lectures supported by the use of a projector, the course also consists of classes dedicated to several applications in laboratories of the experimental techniques described. Some seminars on particular subjects will be planned.

MODALITA' D'ESAME

The examination will consist in an oral test. Students will discuss the subjects of the course, demonstrating the knowledge of standard, of experimental methods and their applications.

APPELLI D'ESAME

ALTRE INFORMAZIONI UTILI

PROGRAMMA ESTESO

Load classification, deformation characteristics, generalized Hooke's law, strength criteria.
Standard concerning aeronautical materials. Mechanical tests on conventional and composite materials, metal and polymer foams. Types of tests and test machines. Tensile test. Compression test. Bending test. Fatigue test. Shear test (V-Notched, Rail Shear, Compact Specimen, Two Rail Shear). Compression After Impact Test (CAI).
Notes on the main experimental techniques for the measurement of displacement, deformation and stress.
Strain gauge techniques. Electrical strain gauges (ER). Sensitivity to deformation. Transversal sensitivity. Reinforcement effect of the strain gauge on the specimen. Temperature sensitivity. Insulation resistance, power supply, drift and fatigue life of the strain gauge. Configurations of the measurement circuit. Application of ER technique to composite materials and aerospace structures. Notes on Optical techniques with particular reference to Digital Image Correlation.
Non-Destructive Testing techniques.
Laboratory tests: Tensile test on a specimen made of metallic and/or composite material, impact test, ultrasonic inspection etc. Applications of Digital Image Correlation to the strength evaluation of aerospace structures.

TESTI DI RIFERIMENTO

1. Society for Exper. Mech.: Handbook on Experimental Mechanics. Prentice-Hall, New Jersey, USA, 1987.
2. Dally J.W., Riley W.F.: Experimental Stress Analysis, McGraw Hill, USA, 1987.
3. Standard and class notes.
4. In Italian: Ajovalasit A.: Estensimetri elettrici a resistenza. Aracne Editrice, Roma, 2006.
5. In Italian: Ajovalasit A.: Fotomeccanica. Aracne Editrice, Roma, 2006