

AEROSPACE ENGINEERING (LM52)

(- Università degli Studi)

Insegnamento AERONAUTICAL TECHNOLOGIES

GenCod A003763

Insegnamento AERONAUTICAL TECHNOLOGIES

Insegnamento in inglese AERONAUTICAL TECHNOLOGIES

Settore disciplinare ING-IND/16

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 2018/2019

Erogato nel 2019/2020

Anno di corso 2

Lingua INGLESE

Percorso PERCORSO COMUNE

Docente TERESA PRIMO

Sede

Periodo Secondo Semestre

Tipo esame Orale

Valutazione Voto Finale

Orario dell'insegnamento

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

BREVE DESCRIZIONE DEL CORSO

The course aims to deepen the aspects related to production technologies applied in aeronautical constructions with particular reference to the choice and function performed by the construction materials and the transformation technologies connected to them.

The materials/technologies solutions mainly used for realization of airframe and structures engine will be discussed. The aspects related to the "Workability of materials, for aeronautical application, by chip removal technologies" will be treated. The processes by plastic deformation will be analyzed. The main elements that characterize the Additive Manufacturing technologies will be provided.

The study and classification of light alloys for aeronautical application as well as superalloys for airframe and engine applications will be addressed. In particular, for the nickel and titanium superalloys, the main aspects that characterize their metallurgy and workability will be studied by comparison with the applications. In the field of plastic deformation technologies, the fundamental principles of super plastic forming and its applicability to the aeronautical sector will be illustrated. At the same time, the aspects relating to assembly processes and in particular those relating to the welding of metallic materials and riveting of the components will be treated. Lastly non-destructive testing for verification of product quality will be tackled.

Numerical exercises will be carried out on some aspects covered in the theory part to familiarize with the physical quantities that characterize them, in addition to laboratory exercises that will be focused on tools for the finite element simulation of: chip removal, forging and additive processes.

PREREQUISITI

It is necessary to have passed Mechanical Technology exam. Knowledge of Technical Industrial Design exam is useful.

OBIETTIVI FORMATIVI

- Knowledge of materials for aeronautical application and processes for their transformation
- Basic knowledge for the characterization of Nickel and Titanium superalloys
- Basic knowledge for characterization and use of Additive Manufacturing technologies
- Basic knowledge for finite element simulation of chip removal, forging and additive processes.

METODI DIDATTICI

Frontal lessons and computer lab exercises

MODALITA' D'ESAME

The exam consists of two tests:

1. in the first test (written), the student must solve a task related to the topics covered during the course; the test aims to determine student's ability to perform autonomously calculations related to the physical quantities that characterize the machining processes discussed during the course.

2. in the second test (oral) the student discusses both the written and other contents of the course, illustrating their level of knowledge and understanding of the topics covered and in order to make relevant cinematic and dynamic analysis.

APPELLI D'ESAME

According to the academic calendar.

PROGRAMMA ESTESO

- Critical analysis of materials/processes for aeronautical application by comparison with the reference context.
 - Exercises on the topics covered.
 - Machinability by chip removal of materials for aeronautical application.
 - Exercises on the topics covered.
 - Hot workability of metallic materials: Forging.
 - Aluminum, Nichel and Titanium alloys.
 - Jointing technologies: welding, bonding, fasteners.
 - Super plastic forming technology.
 - Additive Manufacturing technology.
 - Non-destructive quality control technologies.
 - Finite element simulation techniques for machining by chip removal, forging, additive and their application to case studies.
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TESTI DI RIFERIMENTO

Testi di riferimento

- Class Notes.
- F.C. Campbell, Manufacturing Technology for Aerospace Structural materials, First Edition, Elsevier, 2006.
- Mikell P. Groover, Tecnologia Meccanica.