

# AEROSPACE ENGINEERING (LM52)

(Brindisi - Università degli Studi)

## Teaching PROCESSING AND PROPERTIES OF COMPOSITE MATERIALS FOR AERONAUTICS

GenCod A004095

**Owner professor** Alfonso MAFFEZZOLI

**Reference professors for teaching**  
ANTONIO ALESSANDRO LICCIULLI,  
Alfonso MAFFEZZOLI

**Teaching in italian** PROCESSING AND PROPERTIES OF COMPOSITE

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**SSD code** ING-IND/24

**Reference course** AEROSPACE ENGINEERING

**Course type** Laurea Magistrale

**Credits** 9.0

**Teaching hours** Front activity hours: 81.0

**For enrolled in** 2020/2021

**Taught in** 2021/2022

**Course year** 2

**Language** ENGLISH

**Curriculum** CURRICULUM AEROSPACE TECHNOLOGY

**Location** Brindisi

**Semester** Second Semester

**Exam type** Oral

**Assessment** Final grade

**Course timetable**

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

### BRIEF COURSE DESCRIPTION

This course provides a strong interdisciplinary approach to composite materials in view of their application in aeronautic structure. Competences on polymer matrices and reinforcements, mechanics of anisotropic materials, fabrication technologies of thermoplastic and thermosetting matrix composites are provided.

### REQUIREMENTS

knowledge of solid mechanics and materials science and technology

### COURSE AIMS

#### **Knowledge and understanding:**

The course provides the basis of knowledge to understand and solve complex new problems in design and processing of composite materials accounting for anisotropy and reactive processing

#### **Applying knowledge and understanding**

The student will be able to apply the basic knowledge on mechanics of anisotropic materials to the design of simple structural elements. A multidisciplinary approach is presented accounting for chemical, materials and mechanical engineering aspects.

#### **Making judgements**

Simplification and synthesis of complex problems is presented in order to promote the judgement and evaluation capabilities of the students

#### **Communication**

The course promotes the development of the following skills of the student: ability to expose in precise and formal terms an abstract model of concrete problems, identifying the salient characteristics of them and discarding the inessential characteristics; ability to describe and analyze an efficient solution for the problem under consideration. A seminar on composite properties is assigned to students

#### **Learning skills**

Autonomous learning is promoted thanks to the use of: different books and slides, numerical methods, homework exercise to be solved in groups of two.

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**TEACHING METHODOLOGY** Lessons, practice with a software implementing micro and macromechanic of composite materials, visit to an industrial plant. Self evaluation tests after each topic by Kahoot

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**ASSESSMENT TYPE** Interview after a seminar on composite properties held during the course and a homework .

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**ASSESSMENT SESSIONS** Assessments dates available at [ing.unisalento.it](http://ing.unisalento.it). The assessment includes the discussion of an assignment followed by an interview

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**OTHER USEFUL INFORMATION** For any question write an email to [alfonso.maffezzoli@unisalento.it](mailto:alfonso.maffezzoli@unisalento.it). Link to the team for online interviews : <https://teams.microsoft.com/l/team/19%3a458cbee969be476aa9eea632273a6e8b%40thread.tacv2/conversations?groupId=7f7c14aa-bc49-4e0a-83a3-df9179e7e81e&tenantId=8d49eb30->

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**FULL SYLLABUS**

- Introduction (2 h.)
- Reinforcement and core materials (18 h) (Prof. Licciulli)
- Thermosetting and thermoplastic matrices (7 h.)
- Micromechanic. (15 h.)
- Macromechanic. (20 h. )
- Properties and ceramic matrix composites (5 h.) (prof. Licciulli)
- Fabrication technologies of polymer matrix materials (12 h.)
- Visit to an industrial plant (3 h.) (prof. Licciulli)

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**REFERENCE TEXT BOOKS**

- P.K. Mallick "Fiber-reinforced composites" CRC Press,
- R.M. Jones "Mechanics of composite materials" Taylor & Francis
- Slides of the course provided by the teacher