



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2023/2024
BACHELOR'S DEGREE (BSC)	MECHANICAL ENGINEERING
SUBJECT	AEROSPACE STRUCTURES DESIGN
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	10657-Attività formative affini o integrative
CODE	02232
SCIENTIFIC SECTOR(S)	ING-IND/04
HEAD PROFESSOR(S)	MILAZZO ALBERTO      Professore Ordinario      Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	3
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	<b>MILAZZO ALBERTO</b> Tuesday    12:00    14:00    Ufficio del docente Thursday    12:00    14:00    Ufficio del docente

**DOCENTE:** Prof. ALBERTO MILAZZO

<b>PREREQUISITES</b>	Knowledge of Mathematics, Physics and Elasticity
<b>LEARNING OUTCOMES</b>	<p>Knowledge and ability to understand: In this course, the student will acquire knowledge to face a preliminary design of the airframe structures. He/she will be able to check static robustness and perform analyses for stiffness requirements.</p> <p>Ability to apply knowledge and understanding: The student will acquire knowledge and methodologies to analyze and solve typical problems of airframe preliminary design and stress analysis. He/she will be able to model the main structures of the airframe and make design choices.</p> <p>Making judgments: The student will acquire a methodology of analysis through which he/she will be able to cope with simple structural problems and make appropriate design decisions.</p> <p>Communicative skills: Ability to communicate by means of technical reports the results of the analyses and chosen solutions.</p> <p>Learning ability: The student will learn the basic principles governing the behaviour of thin-walled structures in airframes. These principles enable the possible study of higher-level topics gained through the ability to access to and understanding of specialized publications.</p>
<b>ASSESSMENT METHODS</b>	<p>Oral exam with presentation of technical reports on the exercises. The examination is aimed at the verification of adequate knowledge of the methodological and operational aspects taught during the course. The exam consists of an oral test comprising three or four questions to the candidate, developed through a discussion and takes about twenty minutes. The candidate must submit for consideration the written reports of the exercises carried out during the course and, as a rule, one of the exam questions deal with the deep discussion of the topics developed in the exercises. The marks are out of 30 with the following assessment.</p> <ul style="list-style-type: none"><li>- Excellent, marks 30-30 cum laude: Excellent knowledge and understanding of the course topics, excellent ability to make connections between course topics and other disciplines, very good articulation of the subject presentation, full mastery of technical language, full ability to autonomously apply knowledge.</li><li>- Very good, marks 26-29: full knowledge and understanding of the course topics, good ability to make connections between course topics and other disciplines, very good articulation of the subject presentation, full mastery of technical language, good ability to autonomously apply knowledge.</li><li>- Good, marks 24-25: good knowledge and understanding of the course topics, reasonable ability to make connections between course topics and other disciplines, good articulation of the subject presentation, good mastery of technical language, ability to autonomously apply knowledge.</li><li>- Satisfactory, marks 21-23: knowledge and understanding of the course topics, poor ability to make connections between course topics and other disciplines, sufficient articulation of the subject presentation, sufficient mastery of technical language, poor ability to autonomously apply knowledge.</li><li>- Sufficient, marks 18-20: minimum knowledge and understanding of the course topics and technical language, just sufficient ability to make connections between course topics and other disciplines, lack of ability to apply the acquired knowledge autonomously.</li><li>- Not sufficient, vote negative: Unacceptable knowledge of the course contents .</li></ul>
<b>EDUCATIONAL OBJECTIVES</b>	The course provides the fundamental tools and methodologies for the static analysis and design of airframes.
<b>TEACHING METHODS</b>	Lectures and exercises
<b>SUGGESTED BIBLIOGRAPHY</b>	<ul style="list-style-type: none"><li>- T.H.G. Megson, Aircraft Structures for Engineering Students, Butterworth Heinemann, 2003</li><li>- Appunti e Dispense del corso</li></ul> Per approfondimenti di tipo applicativo <ul style="list-style-type: none"><li>- E.F. Bruhn, Analysis and design of flight vehicle structures, Tristate Offset Company.</li></ul>

## SYLLABUS

Hrs	Frontal teaching
4	Aircraft geometry
6	Aircraft loads and structural arrangements
2	Flight envelope
1	Airworthiness regulations
5	Thin-walled structures under shear/bending
3	Thin-walled structures under torsion

## SYLLABUS

Hrs	Frontal teaching
6	Buckling
6	Wing and fuselage analysis and design
Hrs	Practice
6	Exercises on shear and torsion of thin-walled structures
12	Wing and fuselage analysis and design
3	Exercises on buckling