

# DESIGN OF A LIGHTWEIGHT ROBOTIC ARM



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**BACHELOR THESIS**



**MASTER THESIS**



**ADP**



**AERO SPACE ENG.**



**MECH. ENG.**

- Robots
- Light weight design
- Metamaterials and composite structures



## Motivation

Traditional robotic arms still face challenges in achieving both lightweight and high dynamic precision. Hence, the overall objective is the development of a lightweight robotic arm, to improve operation safety and efficiency. Based on reference robot arm, the student will develop and enhance design with innovative meta-structure, metamaterial, and bio-based composite materials. An optimization analysis, based on a multi-objective design process, will be carried out in view to satisfy structural rigidity, a proper dynamic behavior (natural frequency and vibration dissipation), a lower weight and a green manufacturing process. The thesis will be performed remotely and supervised by UNINA, Naples.

## Tasks

- Literature research
- Design and detailed modelling and evaluation of kinematic and dynamic behavior of the optimized robot arm

## Desirable:

- Experience in structural design
- CAD/FEM basic knowledge

## Start

September 2025



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