

## Turboprop Design

Academic Year: ( 2023 / 2024 )

Review date: 27-04-2023

Department assigned to the subject: Aerospace Engineering Department

Coordinating teacher: RAIOLA , MARCO

Type: Electives ECTS Credits : 3.0

Year : 4 Semester :

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Fluid Mechanics II
- Thermal Engineering
- Aerodynamics I
- Aerospace Propulsion I

## OBJECTIVES

The goal of this course is that the student acquires a basic knowledge of aircraft propellers and turbo-prop engines.

## DESCRIPTION OF CONTENTS: PROGRAMME

Introduction to propulsion systems

- Review of basic principles of propulsion
- Overview of different aeronautic engines

The Propeller

- Geometry and characteristics of propellers
- Momentum and blade element theory
- Propeller propulsive efficiency
- Propeller noise
- Propeller testing
- Design of optimum propellers

Turboprop and Turbohaft Engines

- Cycle analysis of conventional-free-turbine turboprop engine
- Optimization of turboprop engines
- Installation issues
- The impact on regional aviation
- The Unducted Fan

## LEARNING ACTIVITIES AND METHODOLOGY

- Theory sessions.
- Problem sessions.
- Computer sessions.
- Lab-sessions.

## ASSESSMENT SYSTEM

In order to pass the subject, two requirements need to be met:

- 1) To have a MINIMUM mark of 4.0/10 in the end-of-term exam;
- 2) To have a MINIMUM overall mark of 5.0/10 (weighing 25% the end-of-term exam mark and 75% the mark of the continuous evaluation).

The continuous evaluation includes 4 reports and a final oral presentation.

<b>% end-of-term-examination:</b>	25
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	75

## BASIC BIBLIOGRAPHY

- D.R. Greatrix Powered Flight. The engineering of Aerospace Propulsion, Springer, 2012
- J. L. Kerrebrook Aircraft Engines and Gas Turbines, The MIT Press, 1992
- R. Von Mises Theory of flight, Courier Dover Publications, 2012