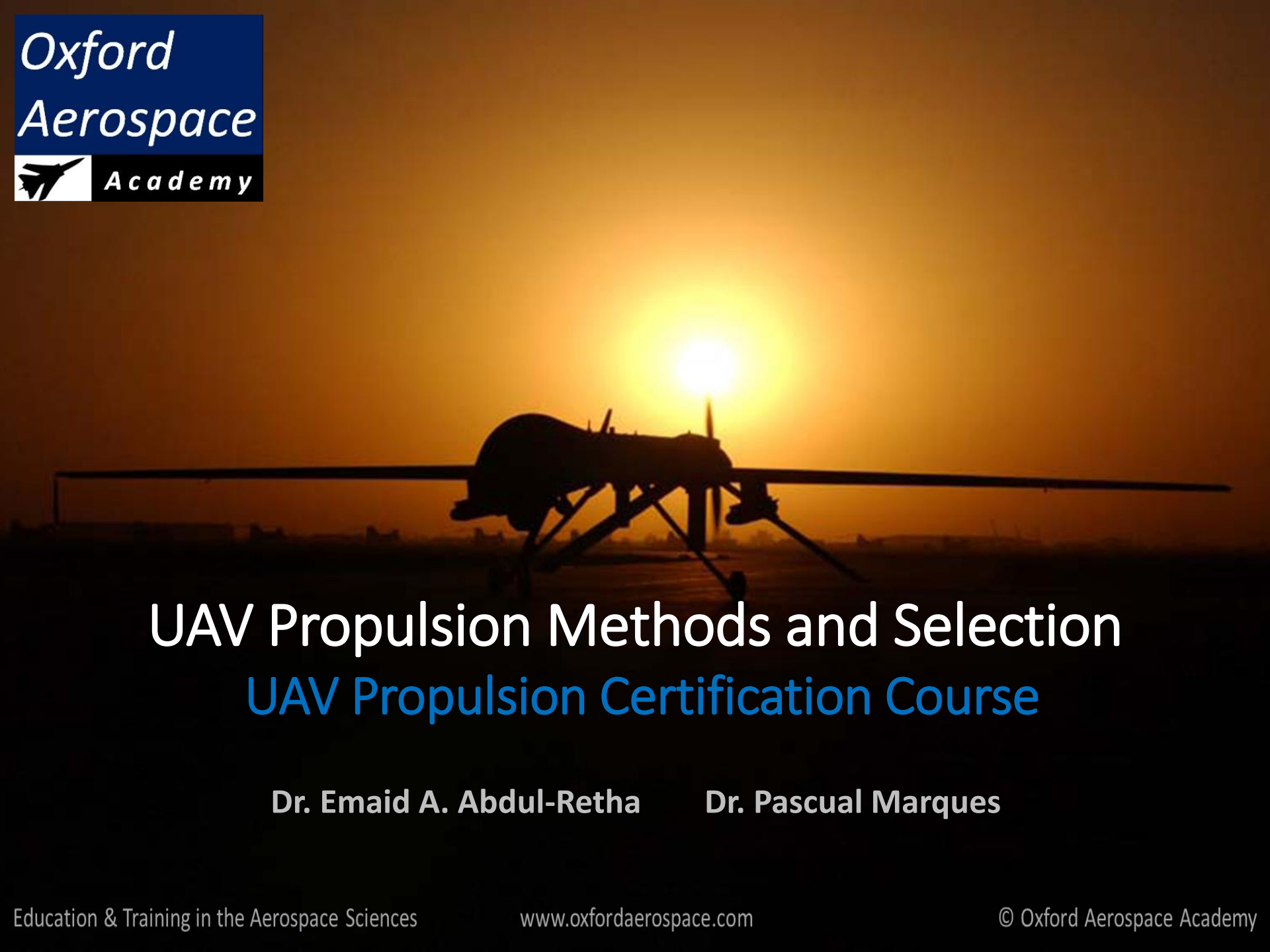
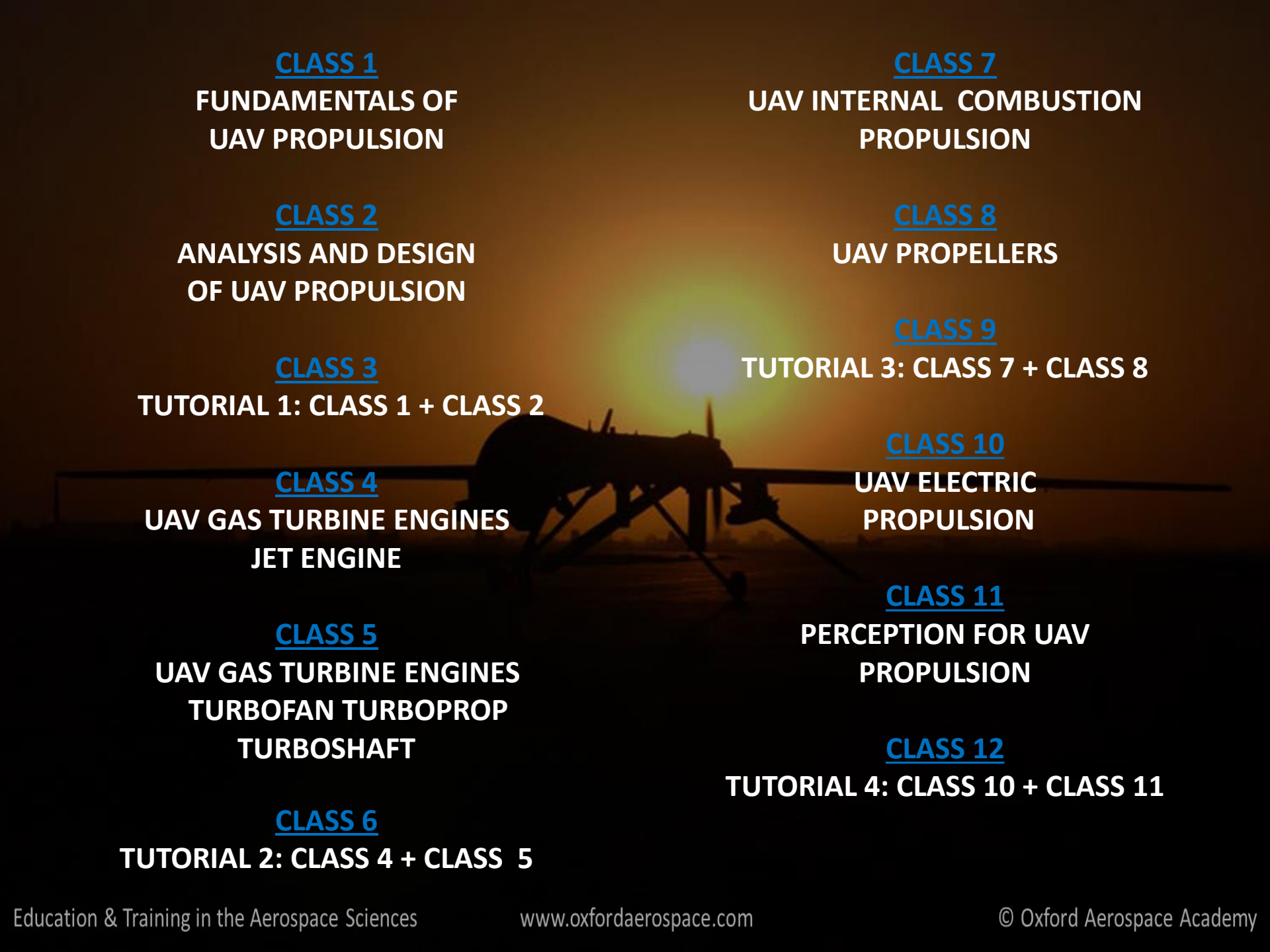


UAV Propulsion Methods and Selection

UAV Propulsion Certification Course

Dr. Emaid A. Abdul-Retha **Dr. Pascual Marques**



CLASS 1
FUNDAMENTALS OF UAV PROPULSION

CLASS 2
ANALYSIS AND DESIGN OF UAV PROPULSION

CLASS 3
TUTORIAL 1: CLASS 1 + CLASS 2

CLASS 4
UAV GAS TURBINE ENGINES JET ENGINE

CLASS 5
UAV GAS TURBINE ENGINES TURBOFAN TURBOPROP TURBOSHAFT

CLASS 6
TUTORIAL 2: CLASS 4 + CLASS 5

CLASS 7
UAV INTERNAL COMBUSTION PROPULSION

CLASS 8
UAV PROPELLERS

CLASS 9
TUTORIAL 3: CLASS 7 + CLASS 8

CLASS 10
UAV ELECTRIC PROPULSION

CLASS 11
PERCEPTION FOR UAV PROPULSION

CLASS 12
TUTORIAL 4: CLASS 10 + CLASS 11

UAV Propulsion Methods and Selection

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This course introduces fundamental engineering issues related to UAV Propulsion Methods and Selection. This course is intended for UAV propulsion engineers, UAV aircraft designers, UAV industry managers, educators, and research and development engineers from relevant agencies.

1200 PowerPoint Slides, Instructor Narrated Audio, Embedded Animations & Videos.

Editors

Dr. Emaid Abdul-Retha

Dr. Pascual Marques

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Dr. Emaid Abdul-Retha

Dr. Emaid A. Abdul-Retha is a Member of the Board of Directors at Oxford Aerospace Academy. He holds Bachelor, Masters, and PhD degrees in Aeronautical Engineering. His research areas include jet engine automatic control systems and modeling of gas turbine engines. He has over 34 years of aviation experience including 20 years of direct experience with unmanned aircraft vehicles. He has been a chief engineer for ten years working on modifications to the MiG-21 and MiG 29 jet fighter aircraft. Dr. Abdul-Retha has supervised several research centers and projects related to aviation and unmanned aircraft and has performed research on many different types of aircraft (fighter, transport, helicopter, agriculture, light, and general aviation). His research related to unmanned aerial vehicles includes the design, manufacture, integration, and testing of many different types (fixed wing UAV, VTOL UAV, jet powered UAV).

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Dr. Pascual Marques

Dr. Pascual Marqués is the CEO and Member of the Board of Directors at Oxford Aerospace Academy, President of Marques Aviation Ltd., UK and International Director (UK) of Unmanned Vehicle University. Dr. Marqués holds an MPhil and a PhD degree in Engineering Mechanics. As President of Marques Aviation Ltd., Dr. Marqués oversees the design, R&D, and manufacturing of the MA THOR unmanned aircraft series. Dr. Marqués' research interests lie in the fields of Aerodynamics at low Reynolds numbers and Flight Stability and he has published extensively on both subject areas. Dr. Marqués is the Editor-in- Chief of the International Journal of Unmanned Systems Engineering (IJUSEng). He is also the Chair of the World Congress on Unmanned Systems Engineering (WUEng) and the International Aerospace Engineering Conference (IAEC).

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Course Description

This course is designed to provide an introduction to the fundamental principles of Unmanned Aircraft Vehicle (UAV) propulsion design. The course is intended as a first course that provides in-depth understanding of state-of-the-art of propulsion issues for UAVs, including propulsion options, cycle analysis, principles of operation, systems, components, and performance and efficiency calculations. Theories of aero-engines and their related background in aerodynamics, thermodynamics and stress analysis are presented. System as well as component engineering aspects of engine aero-thermo-mechanical design are examined. Unmanned Aircraft Systems alternative power and propulsion power management is also discussed.

Students will learn the following topics: Fundamentals of UAV Propulsion, How to Classify UAV Engines by Type and Mission, UAV Propulsion Operation, Types of UAV Propulsion, Applications & Design, UAV Propulsion Selection and Matching, UAV Propulsion Assist Devices, Propeller Types and Requirements, Principles of UAV Engine Control & Regulation, UAV Power Resources & Alternatives, UAV Engine Selection by Efficiency, Trade Studies and Costs, and Maintenance, Repair and Overhaul (MRO).

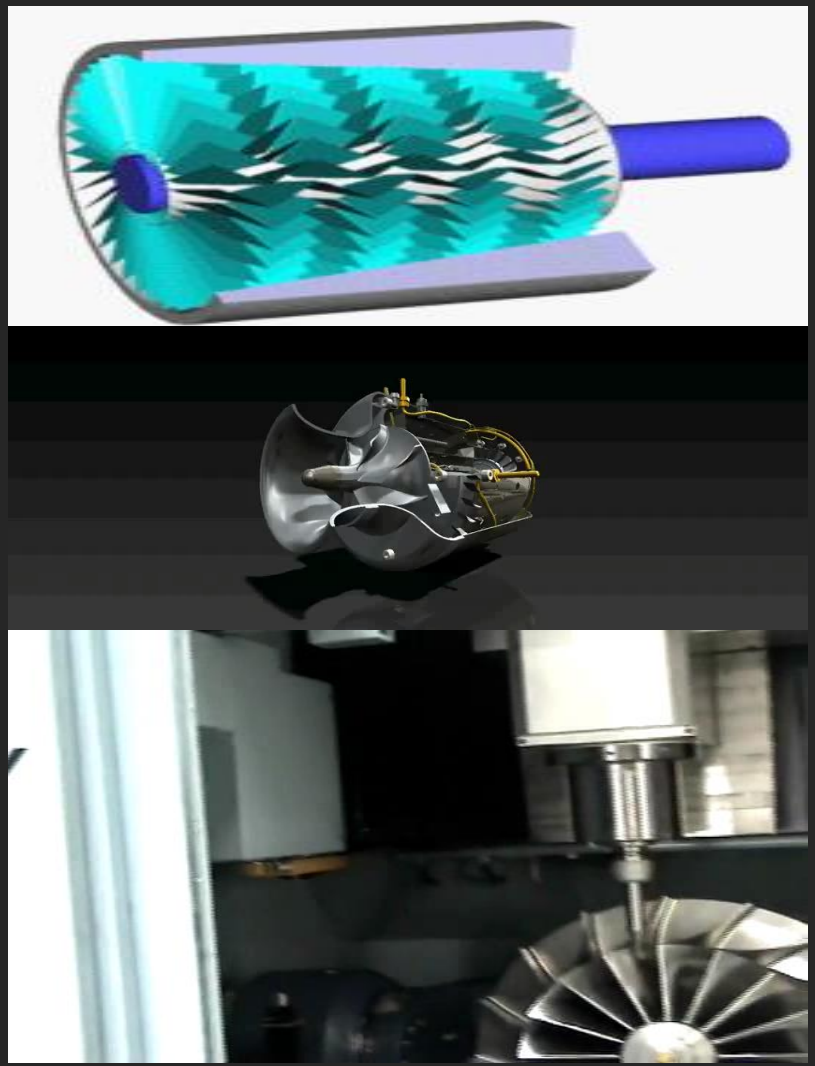
Sample topic: Centrifugal Compressor

Replay Narrated Recording

A brief comparison of axial and centrifugal compressors:

1. According to the degree of compression in the stage. Greater pressure ratio provides the stage of the centrifugal compressors.
2. To implement the multi-stage. Multiple air deflection in a centrifugal compressor leads to the complexity of multi-stage.
3. Centrifugal compressors typically have a fairly large diameter of the impeller. Multistage axial compressors have a smaller diameter, but are longer in the axial direction.
4. Axial compressors are mainly used in large UAV propulsion and centrifugal compressors in small gas turbine engines.

Play Animations, Videos & Music



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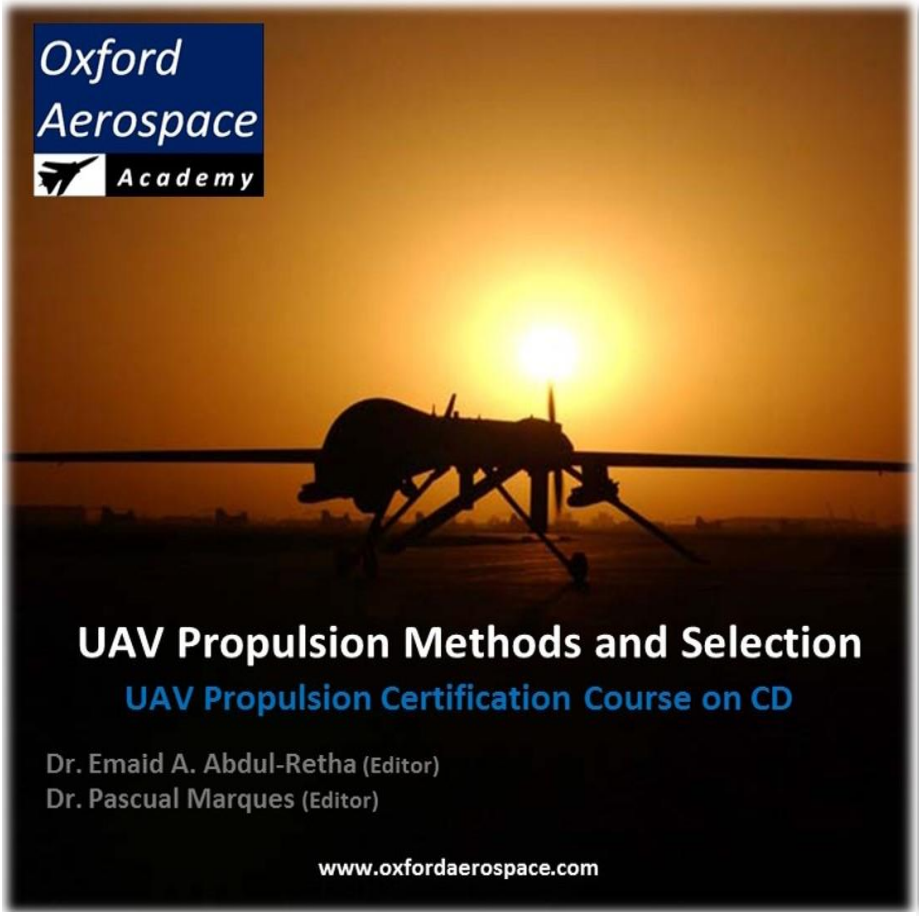

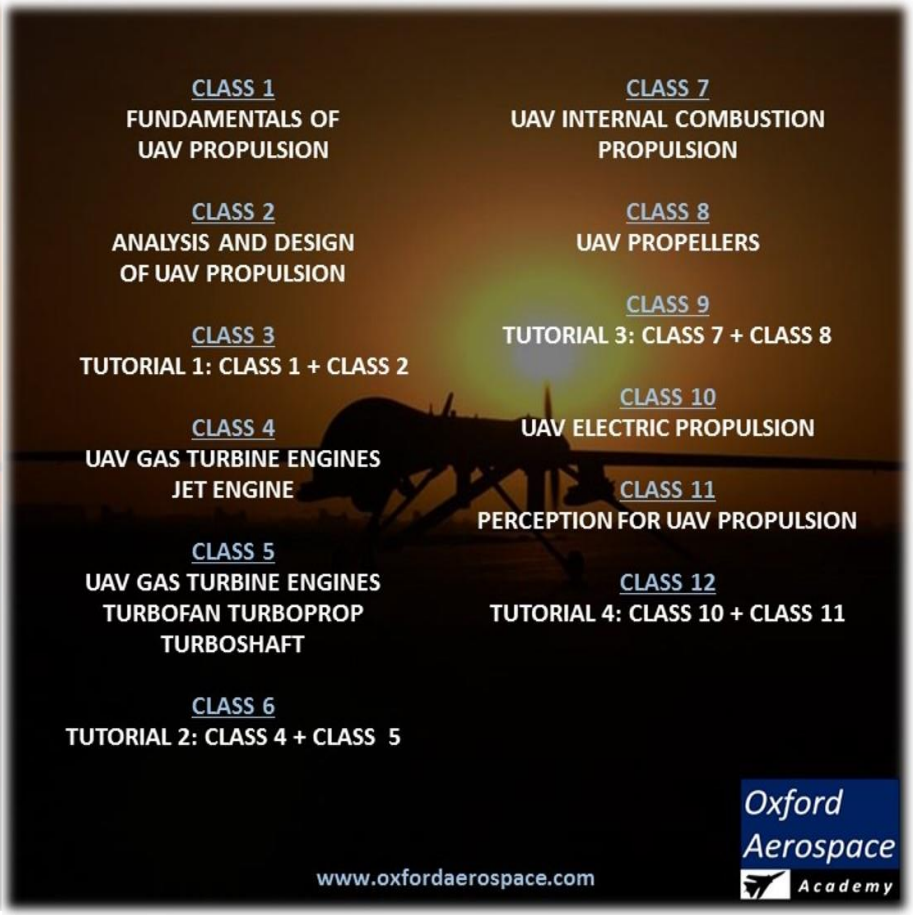

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