

Aerospace Propulsion

Special Subjects
Elective 2 credit

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1. Course Description

The functions and performances of such turbo-engines as turbojet engine, turbofan engine, etc. are studied based on the basic knowledge of thermodynamics, aerodynamics, etc.. Students will acquire the knowledge and techniques for the calculation related to DP1 and DP2.

2. Course Objectives

The target of this lecture is for students to acquire an ability to understand the principle of the function of the turbojet engine, turbofan engine, turbo-prop engine and the turbo-shaft engine applied to the aero-propulsion system. Students will also be able to understand the characteristics of each type and the differences of functions between them.

3. Grading Policy

Graded by evaluation of report submitted by students.

4. Textbook and Reference

Textbook

No text is used.

Reference

Materials including figures, pictures and movies are indicated on slide.

These will be presented by LMS.

5. Requirements(Assignments)

Review the following subjects.

1.Dynamics

2.Thermodynamics

3.Aerodynamics

4.Structural-dynamics

5.Differentiation and integration

6. Note

The contents of the lesson may be changed according to the progress.

7. Schedule

- [1] Types and characteristics of the aero-engine
- [2] Overview of the turbo-engines
- [3] Power of the turbo-engine
- [4] Efficiency of the turbo-engine
- [5] Basic components of the turbo-engine-1:Basic structure
- [6] Basic components of the turbo-engine-2:Air-inlet, Fan and Compressor
- [7] Basic components of the turbo-engine-3:Combustion chamber and Turbine
- [8] Basic components of the turbo-engine-4:Exhaust system and Accessories
- [9] Conservation of momentum
- [10] Characteristics of multi-staged compressors
- [11] Compressor stall (surging)
- [12] Flutter of the turbine blades
- [13] Accessories of the turbo-engine-1:Fuel supply subsystem and ignition subsystem
- [14] Accessories of the turbo-engine-2:Control subsystem and Lubrication subsystem
- [15] Materials used for the turbo-engine