

Unmanned aircraft engineering

Special Subjects
Elective 2 credit

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1. Course Description

In this course, at first, the history and current status of Unmanned Aerial-vehicle System (UAS) will be overviewed. Then brief review of basic theory such as flight dynamics, overview of UAV structure, propulsion subsystem, equipment subsystem, electrical subsystem, radio communication subsystem, guidance, navigation and control subsystem and the ground facilities necessary for UAV operation will be lectured on.

In this course, you will acquire expertise on DP1 of the Graduate School of Science and Technology. Also, you will acquire information gathering ability, logical thinking ability, assignment setting ability to obtain a comprehensive viewpoint on DP2.

2. Course Objectives

In this course, students will understand the configuration of the various Unmanned Aerial-Vehicle (UAV) subsystems, UAS system including several ground equipment, and also the design concepts. Through this series of lectures, students will master the basic knowledge of UAS. After that, we will discuss the future UAS.

3. Grading Policy

Evaluation will be done referring reports(80%) and remarks made in the discussion(20%).

4. Textbook and Reference

Textbook

Texts will be given in lectures as necessary.

5. Requirements(Assignments)

Basic knowledge of design technology of an airplane, airframe structural design, aerodynamics, flight dynamics, flight control, system engineering etc. were studied in undergraduate school in order to understand the lectures in this course (1.5 hours). And also, the fundamentals of the differentiation and the integration must be reviewed and the ability to read English papers and/or documents is inevitably necessary. Students are required to read materials in advance (1.5 hours).

6. Note

Mainly PowerPoint and projector will be used.

7. Schedule

- [1] Introduction.
- [2] Historical developments of UAV and UAS.
- [3] Several UAS missions and UAV examples.
- [4] Conceptual design of UAV.
- [5] Airframe structure of UAV.
- [6] Aerodynamic design of UAV.
- [7] Flight control system of UAV. (1)
- [8] Flight control system of UAV. (2)
- [9] Electrical and electronic equipment of UAS.
- [10] Radio communication system of UAS.
- [11] Ground facilities necessary for UAV operation.
- [12] Flight safety, reliability.
- [13] Development process of UAS.
- [14] Future UAS. (1)
- [15] Future UAS. (2)