

Aircraft performance and stability

Titulaire

Axel Coussement (Coordonnateur)

Mnémonique du cours

MECA-H506

Crédits ECTS

4 crédits

Langue(s) d'enseignement

Anglais

Période du cours

Premier quadrimestre

- › In-depth knowledge and understanding of the advanced methods and theories to schematize and model complex problems or processes
- › Reformulate complex engineering problems in order to solve them (simplifying assumptions, reducing complexity)
- › Correctly report on research or design results in the form of a technical report or in the form of a scientific paper
- › Collaborate in a (multidisciplinary) team
- › A creative, problem-solving, result-driven and evidence-based attitude, aiming at innovation and applicability in industry and society
- › A critical attitude towards one's own results and those of others
- › The flexibility and adaptability to work in an international and/or intercultural context
- › Has an in depth scientific knowledge, understanding and skills in at least one of the subfields needed to design, produce, apply and maintain complex mechanical, electrical and/or energy systems;

Contenu du cours

Stick-fixed and stick-free longitudinal static stability, lateral static stability. General dynamical equations of motion. Small disturbance theory, linearized equations. Aerodynamic derivatives. Dynamic stability: longitudinal modes (phugoid and short-period oscillation); lateral modes (spiral mode, roll convergence, Dutch roll). Response to controls. Introduction to the design of closed-loop controls.

Objectifs (et/ou acquis d'apprentissages spécifiques)

At the end of the course, the student should be able to determine the stability characteristics of aircraft, the effect of the various controls on the aircraft dynamics, as well as understand the basic principles of automatic flight control systems.

Pré-requis et co-requis

Cours pré-requis

MECA-Y405 | Damage testing in aeronautics | 3 crédits

Méthodes d'enseignement et activités d'apprentissages

Lectures+ exercises sessions and project.

Contribution au profil d'enseignement

This teaching unit contributes to the following competences:

- › In-depth knowledge and understanding of exact sciences with the specificity of their application to engineering

Références, bibliographie et lectures recommandées

B. Etkin et L. D. Reid: Dynamics of flight. Stability and Control, Wiley, 1995. B.N. Pamadi: Performance, Stability, Dynamics and Control of airplanes, AIAA Education series, 1998 T.R. Yechout et al.: Introduction to aircraft flight mechanics. Performance, static stability, dynamic stability and classical feedback control, AIAA Education series, 2003.

Autres renseignements

Contact(s)

Service d'Aero-Thermo-Mécanique - CP 165/41 Bât L, Porte E, Niv 3, local 116A Tél : 02/650 26 48 - Fax : 02/650 27 10 Mail : gdegrez@ulb.ac.be

Méthode(s) d'évaluation

Autre

Méthode(s) d'évaluation (complément)

Project report. Written exam (theory+exercises).

Programmes

Programmes proposant ce cours à l'école polytechnique de Bruxelles

MA-IREM | Master : ingénieur civil électromécanicien | finalité Spécialisée/bloc 2

