King Mongkut's University of Technology Thonburi
Faculty of Engineering
Department of Mechanical Engineering

Course Syllabus

Lecture Course:	MEE556: Aeroelasticity
Year/Term:	2553/1
Lecturer(s):	Chawin Chantharasenawong Mechanical Engineering Department Ext: 9280 (chawin.cha@kmutt.ac.th)
Duration:	39 hours of lectures (3 hours of lectures per week, 13 weeks)
Prerequisite:	MEE241 Fluid Mechanics I
Tutorial Hours:	Email for appointment

Course Descriptions :

Aeroelasticity is the study of effects of aerodynamic forces on elastic bodies, i.e. fluid-structure interactions. Analysis of stability, or more importantly instability, of objects immersed in a moving fluid is the main focus of the course. The course structure is mainly divided into two parts namely static and dynamic aeroelastic stability analysis.

Static aeroelasticity deals with the divergence of a lifting surface and aircraft control reversal. Dynamic aeroelasticity involves buffeting, flutter of a wing and oscillating aerofoils. Unsteady aerodynamics and dynamic stall also play a part during the flutter and these phenomena will be examined.

Course breakdown by lectures

Topic No.	*Description*	*Week(s)*
1	Introduction to aeroelasticity Description of course objectives and outlines Physics of the airflows and fluid-structures interactions Formulation of equations of motion	1
2	Divergence of a lifting surface	2
3	Aircraft control reversal	3
4	Aeroelastic flutter analysis	4
5	Unsteady aerodynamics and dynamic stall	5-6
6	Numerical computation of flutter with MATLAB	7-9
7	Numerical modeling of two-dimensional aerofoil aeroelastic oscillation	10-11
8	Engineering application of aeroelastic analysis	12-13

Course notes and delivery

Handouts will be available from http://staff.kmutt.ac.th/~chawin.cha/ . Students are expected to make a copy and bring them to the class.

Handouts contain a summary of the materials described in the syllabus and students should consult recommended textbooks for further information on the subject.

Assessment

The course is assessed by projects, classroom quizzes, tutorials (homework), closed book mid-term and final examinations. The total grade is determined using the following weighting scheme.

1.	Tutorials / Homework	10%
2.	Coursework	30%
3.	Midterm examination	30%
4.	Final examination	30%

- Examination timetable will be arranged at a later date.
- Each student is allowed to bring one non-graphical scientific calculator into examinations
- Students must be present in all examinations otherwise they will receive an *Fe*-grade. Only extenuating circumstances will be accepted as an excuse for missing an exam. Health related excuses require medical reports and the signature of a physician that provided treatment.

Recommended textbooks

1. *Title:* An Introduction to the Theory of Aeroelasticity (2002)
   Author: Fung Y. C.
   Publisher: John Wiley & Sons
   Relevance: A

2. *Title:* Introduction to structural dynamics and aeroelasticity (2002)
   Author: Dewey H. Hodges, G. Alvin Pierce
   Publisher: Cambridge University Press
   Relevance: A

3. *Title:* Principles of helicopter aerodynamics (2006)
   Author: Leishman J. G.
   Publisher: Cambridge University Press
   Relevance: A

4. *Title:* Introduction to Aircraft Aeroelasticity and Dynamic Loads (2007)
   Author: Wright J. R. and Cooper J. E.
   Publisher: John Wiley & Sons
   Relevance: B