

# ME453A: Finite Element-Based Modeling & Simulation of Linear Fluid/Structure Interaction Problems

Schedule: Winter 0X, Tu-Th 11:00 am – 12:30 pm

Units : 3



### **Course Description**

A Ph. D.-level course for graduate students interested in understanding the basic physics behind many fluid/structure interaction phenomena, and learning finite element-based computational approaches for modeling and simulating them in the frequency domain. The course covers introductory material pertaining to a class of linear fluid/structure problems characterized by a long duration of the interaction and limited fluid displacements.

## **Course Outline**

Vibrations of elastic structures - Linearized equations of small movements of inviscid fluids -Sloshing modes - Hydroelastic vibrations - Acoustic cavity modes - Structural-acoustic vibrations (interior and exterior problems) --- Applications to the design of liquid containers and analysis of underwater signatures.

## **Prerequisites**

A graduate course in the Finite Element method or Instructor's consent.

## <u>Textbook</u>

- H. J.-P. Morand and R. Ohayon, Fluid Structure Interaction, J. Wiley & Sons, 1995, (ISBN: 2-225-84682-0).
- **4** Lecture notes and various reading materials.

## **Instructor**

Charbel Farhat Department of Mechanical Engineering Institute for Computational and Mathematical Engineering Building 500, Room 501G, 488 Escondido Mall, Mailcode 3035 Telephone: (650) 723-3840; FAX: (650) 725-3525; e-mail: cfarhat@stanford.edu