ME250 Aug. 3:0

Structural Acoustics

Instructor

Venkata R. Sonti
Email: sonti@iisc.ac.in

Teaching Assistant

Email:

Department: Mechanical Engineering

Course Time:

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

This course is a graduate level course. The prerequisite is ME 249, fundamantals of acoustics and ME253 vibrations of plates and shells. This course deals with the topic of sound and structure interaction. For example, the engine pulsations excite the cylinder block and the chassis. These vibrations are transferred to the automobile body and then radiated as sound. So the course involves the mechanism of sound generation from vibrations.

Prerequisites

ME249 Fundamentals of acoustics

ME253 Vibrations of plates and shells

Syllabus

Crighton's classical problem of an infinite plate in contact with a fluid half space and excited by a line force. Complex variables, coutour integration using branch cuts, asymptotic methods. Sound structure interaction in an infinite wave guide using asymptotic methods. Sound structure interaction in an box enclosing acoustic fluid. Exterior radiation from a rectangular vibrating plate set in an infinite rigid baffle. The course is

analytical and uses mathematical methods.

Course outcomes

The student will

1) know how to pose and sound structure interaction problem.

2) understand how sound and structure coupled waves behave. How fluid affects the structure and vice versa.

3) get know most commonly used analytical methods to deal with the mathematics.

Grading policy

1) 20 % assignments

2) 15% each for two mid term exams

3) 50% for written final

Assignments

Resources

1) Sound and its interaction with structures by Frank Fahy

2) Structure Borne Sound by Cremer and Heckl

3) Sound Structure Interaction by Junger and Feit.