

--- Course Description ---

MECH 584 Advanced Engineering Acoustics

Designation

MECH 584, section 101 - catalogue number 45429 - 3 credits

Coordinator

Dr. Murray Hodgson, Professor, 604-822-3073

Prerequisites

Students should normally have taken an engineering or physics course in acoustics at the undergraduate level and be registered as graduate students.

Objective

To provide students with a thorough conceptual understanding of, and some practical experience with, fundamental and topical acoustical phenomena and their applications in research. To provide students with experience in researching, preparing and giving university lectures.

Format

The course will consist of about 12, 2-3 hour lectures on fundamental topics in acoustics (see below). Some of the lectures will be given by invited and departmental specialists in the field of acoustics. The remaining lectures will be prepared and given by the students under the supervision of the course coordinator. Lecture topics will be chosen, and assigned to students, on the basis of their interests and backgrounds.

Students will also undertake a small project related to their lecture topic. The objective is to reinforce the lecture material and give students experience of acoustical theory, analysis and experimentation. A report on the project work will be prepared for evaluation.

Evaluation (subject to change):

- Lecture presentation = 40 %
- Final exam = 20 %
- Project report = 40 % (planning intro=5%; progress report=5%; final report=30%)
- Total = 100 %

LECTURE TOPICS AND LECTURERS

Mandatory (mainly profs):

1. Sound sources, waves, propagation (MH)
2. Reflection / transmission at fluid interfaces (MH)
3. Sound-structure interaction (Prof. S. Phani, MECH, UBC)
4. Sound propagation in ducts, pipes (MH)
5. Sound radiation from structures, musical instruments (Prof. C. Waltham, PHAS, UBC)
6. Underwater sound propagation (Prof. S. Dosso, SEOS, U.Vic.)
7. Ultrasound (Prof. R. Rohling, ECE/MECH, UBC)
8. Sound in rooms – wave approach
9. Sound in rooms – geometric approach (MH)
10. Outdoor sound propagation

Optional (students):

11. Sound transmission through partitions
12. Sound-absorbing materials
13. Active noise control
14. DSP for acousticians
15. Numerical methods in acoustics
16. Psychoacoustics
17. Acoustical transducers (loudspeakers, microphones)
18. Acoustical imaging, holography
19. Auralization
20. Ventilation System Noise and its Control
21. Non-linear Acoustics