

## **Acoustics Engineering**

Code: ELC 455; Lectures : 3 hr/wk , Tutorials : 1 hr/wk

**Course Synopsis:** Plane and spherical sound waves - Simple and combinations of sound sources - Mechanical and acoustical dynamically analogous circuits - Acoustic transducers - Loudspeakers types and systems - Microphones types and systems - Measurements of sound - Acoustics and Hearing - Acoustic environment outdoors - Acoustic environment indoors -

### **Overall Aims of Course**

This course is to provide a thorough understanding of the engineering aspects of the performance of sound in different environments, as well as the different governing equations of this performance. Various sources and transducers are dealt with for a good command of their operation and design. Design of successful sound systems is the main objective of this course.

### **Course Contents:**

#### **Chapter [1] Acoustic Waves and Sources**

- Plane waves
- Spherical waves
- Point sources
- Piston in an infinite baffle

#### **Chapter [2] Dynamically Analogous Circuits**

- Mechanical Circuits
- Acoustical Circuits

#### **Chapter [3] Acoustic Transducers**

- Loudspeakers
  - Direct radiator loudspeaker
  - Wide band loudspeaker systems
  - Horn loudspeaker
- Microphones
  - Pressure microphones
  - Velocity microphones
  - Unidirectional Microphones

## **Chapter [4] Environmental Acoustics**

Measurements of sound  
Aural environment  
Acoustic environment outdoors  
Acoustic environment indoors

### **Reference:**

**Egan, M. D.**, Architectural Acoustics, McGraw-Hill, Inc., 1988.

**Beranek, L. L.**, Acoustics, McGraw-Hill, Inc., 1993.

**Irvine, L. K. and Richards, R. L.**, Acoustics and Noise Control Handbook for Architects and Builders, Krieger Publishing Company, 1998.

**Beranek, L. L.**, Noise and Vibration Control, McGraw-Hill, Inc., 1971.

**Kinsler, L. E., and Frey, A. R.**, Fundamentals of Acoustics, John Wiley & Sons, 1982

**Everest, F. A.**, The Master Handbook of Acoustics, McGraw-Hill, 1994.

**Knudsen, V. O. and Harris C. M.**, Acoustical Design in Architecture, John Wiley & Sons, 1978