



Electroacoustic Measurements Sept 21, 2015, Boston, MA

This course focuses on the fundamentals of electroacoustic measurements, including principles of acoustics, instrumentation, and data interpretation as well as practical information on how to perform appropriate tests. This course is intended for technical persons who are responsible for the acoustical performance of audio and electroacoustic products and audio, either in R&D or in Production. The course is appropriate for both novices and persons with some test and measurement experience. This training enables participants to perform accurate audio and electroacoustic tests and provides them with the necessary tools to understand and correctly interpret the results.

Class Outline

Introduction

- Transducers & Reciprocity
- Subjective & Objective Tests
- Loudspeaker and Microphone Test Systems

Basic Acoustics and Measuring Sound

- Sound Pressure & Sound Pressure Level
- Wavelength & Frequency
- The Decibel and Working with Decibels
- Weighting Networks
- Detectors, and Time Constants

Sound Sources and Sound Fields

- Ideal Sources, Sound Radiation, and Sound Fields
- Transmission, Reflection and Diffraction
- Elementary Room Acoustics
- Anechoic Chambers and Reverb Rooms

Psychoacoustics & Hearing

- Frequency and Dynamic Range
- Masking & Critical Bands
- Directional Effects
- Anatomy of the Ear
- Detection and Signal Processing within the Ear
- Loudness & Hearing Loss

Measurement Microphones

- Principles of Operation
- Frequency & Dynamic Range
- Microphone Types, Selection and Applications
- Field Calibration

Frequency Analysis

- Signal Types
- Filters and Filter Analysis
- Confidence Limits, and Averaging Time
- The FFT
- Time Windows, Overlap & "Real Time" Analysis



System Analysis

- Time & Frequency Domains
- Causal Linear Time-Invariant Systems
- Analysis Methods: Dual Channel FFT, MLS, TDS
- Stimulus Signals

Simulated Free Field Measurements

- Sound Paths, Correlated and Uncorrelated Noise
- Quasi-Anechoic Test Methods
- Near Field Measurements
- Time Selective Techniques

Distortion & Non-Linearity

- Non-Linear Systems & Distortion Order
- Distortion Audibility
- Transducer Defect Detection
- Harmonic, Intermodulation & Difference Frequency Distortion Tests
- Measurements of Band-Limited Systems
- Multi-Tone Distortion
- THD + N
- Signal-to-Noise Ratio and Non-Coherent Power
- Time Variance and Linearity Measures

Special Topics

- Impedance and Small Signal Parameters
- Vibration Measurement and Modal Analysis
- Free Field Microphone Testing
- Sound Field Equalization
- Directional Measurements and Polar Response
- Directivity Index
- Simulated Diffuse Field Testing
- Equivalent Input Noise
- Time-Frequency Analysis

Instructor: Christopher J. Struck, CEO & Chief Scientist – CJS Labs

Cost: \$495 (\$350 with Listen support contract)

Registration:

Registration closes two weeks before the course. Late registration will be accepted based on available space. The seminar fee includes lunch, coffee breaks, and a complete materials package. Payment in U.S. Dollars only. Checks should be made out to Listen, Inc; Visa, Mastercard and AMEX are also accepted. A space is guaranteed once full payment has been received. Full refunds will be made for cancellations received no later than two weeks prior to the seminar. Listen, Inc. reserves the right to substitute instructors and to cancel this course in the event of insufficient registration.

Location:

The training course will be held at The Listen Offices, 580 Harrison Ave, Boston, MA 02118. Course registration starts at 8:00 AM and the training course is 8:30 AM to 5:00 PM each day. There is a wide choice of hotels in the area, and rates vary considerably from week to week. These are some of the more moderately priced ones, and prices are correct as of 7/15/2015. Websites such as Hotels.com and Priceline often offer better room rates and a good selection of local hotels.



<p>DoubleTree by Hilton: \$299 821 Washington Street, Boston MA www.doubletree.hilton.com/Boston Tel 617-956-7900 Distance: 0.6 miles</p>	<p>Boston Park Plaza: \$281 50 Park Plaza at Arlington Street, Boston, MA Tel 800-225-2008 www.bostonparkplaza.com Distance: 0.9 miles</p>
<p>Hampton Inn: \$279 811 Massachusetts Avenue, Boston, Massachusetts, 02118 Tel 617-445-6400 Distance: 0.8 miles http://bostonhamptoninn.com/</p>	<p>Best Western Roundhouse: \$236 891 Massachusetts Avenue, Boston, MA Tel 617-989-1000 www.bestwesternmassachusetts.com/hotels/best-wester-plus-roundhouse-suites Distance: 0.9 miles</p>
<p>Holiday Inn Express in South Bay: \$226 69 Boston Street, Boston, MA Tel 617-288-3030 www.ihg.com/holidayinnexpress/hotels/us/en/boston/boshj/hoteldetail Distance: 1.3 miles</p>	<p>La Quinta Inn & Suites--\$199 23 Cummings Street, Somerville, MA Tel 800-753-3757 www.lq.com Distance: 5.3 miles</p>