**Headphone & Headset Measurements**

This presentation A review of basic electroacoustic measurement concepts including gain, sensitivity, sound fields, signals, linear, and non-linear systems is presented. The Insertion Gain concept is introduced. The free and diffuse fields orthotelephonic response is described as a target for the receive response. Equivalent volume and acoustic impedance are defined. Ear simulators and test manikins appropriate for Circum- Supra- and Intra-aural and Insert earphones are presented. The salient portions of the IEC 60268-7 standard are reviewed, and examples are given of the basic measurements: Frequency Response, Distortion, Impedance. Measurements of Acoustic Noise Cancelation Noise (ANC) devices are discussed. Microphone-related acoustics and testing for headsets is also presented. Measurements of devices equipped with Noise Discriminating Microphones are described. References for additional detailed information are provided.

**Instructor**

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**Course Outline**

* **Earphones & Receive Performance**
  + **Orthotelephonic Response & The Insertion Gain Concept**
  + **Acoustic Impedance & Earphone Types**
  + **Couplers, Ear Simulators, & HATS**
  + **Interfacing to the Device Under Test**
  + **Electroacoustic Measurements**
    - **Electrical Impedance**
    - **Frequency Response**
    - **Free and Diffuse Field Corrected Response**
    - **L-R Tracking**
    - **Harmonic, Difference Frequency, Intermodulation Distortion**
    - **Crosstalk**
    - **Noise Isolation & Noise-canceling Headphones**
    - **Maximum Voltage & Maximum Output**
* **Microphones & Send Performance**
  + **Microphone Power**
  + **Mouth Simulators & Calibration**
  + **Electroacoustic Measurements**
    - **Frequency Response**
    - **Equivalent Input Noise**
    - **Noise Canceling/Proximity Effect**
    - **Intermodulation Distortion**
* **Conclusion**