# SysTune Seminar Agenda

This 2-day seminar is both for beginners as well as for advanced system engineers and sound technicians. After the first day participants will be able to make basic measurements and have a general understanding of the tools and techniques used in measurement of sound systems. The second day will then explore more advanced techniques using specific examples of sound systems. Windowing, intelligibility, and reverberation time will be included in the topics to explore.

## Agenda

Day 1:

1. Introduction and overview
2. FFT measurement fundamentals
3. Installation and licensing
    a. User files
    b. AFMG license manager
4. SysTune setup
    a. Hardware
    b. Software
    c. Setup Files
    d. Multi-Channel Options
5. General layout of SysTune
    a. Menu Bar
        i. File
        ii. Configure
        iii. Help
    b. Tabs
        i. Measure
            1. Input *Channel selection & mini-meters, gain, delay offset – peak & auto, calibrate, reference channel, start analysis*
            2. Output *Signal selection, channel selection, play signal*
            3. Measurement Parameters *FFT size, averages, reset*
            4. Level Tab
            5. Overlay Tab *Capture measurement, color, visibility, naming, overlay properties, load, average, save, remove*



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ii. Tools
    1. Band Pass Filter
    2. Skip Pauses
    3. SSA Filter
iii. Monitor
    1. SPL
    2. LEQ

c. Displays
    i. Input Time signal, spectrum, spectrogram
    ii. Levels NC, histogram
    iii. Transfer Function IR, ETC, magnitude, phase
    iv. Results *RT, STI*
    v. External Plug-Ins, virtual EQ
    vi. Display Tabs Dependent on the selected display
    vii. Axes Settings
d. Mouse Bar
    i. Display
    ii. Control
e. Status Bar

6. First measurements
    a. Calibrating the Input
    b. Selecting the FFT Size & Number of Averages
    c. Evaluating a Measurement (Time Domain)
        i. Peak Energy (not necessarily initial arrival of energy)
        ii. Inserting Delay between channels
        iii. Reflections
    d. Evaluating a Measurement (Frequency Domain)
        i. Comb Filtering
        ii. Coherence
        iii. IR Stability
    e. Miscellaneous Display Functions
        i. Zooming In
        ii. Smoothing
        iii. Overlays & Cursors



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7. Improving the measurement
    a. Signal to Noise Ratio *Everything that is not the desired signal is noise. So what is the desired signal? It depends.*
    b. Causes of Measurement Contamination
        i. Ambient Noise
        ii. Reflections
    c. Minimizing Noise Contamination
        i. Averaging
        ii. Band Pass Filter
        iii. SSA Filter *Setting parameters*
    d. Windowing Out Reflections (Time Domain) *Resulting frequency resolution & low frequency limit of good data*
        i. Standard Window vs. Half-Window Approach
        ii. Setting Window Parameters
            1. SysTune defaults
            2. User-Defined parameters
        iii. The Time-Frequency-Constant Window
8. Delay analysis
9. Multichannel measurement
    a. Multi-Measurement Averaging with Multiple Mics
    b. Multi- Measurement Averaging with a Single Mic
10. Plug-ins *(DSP control, health regulations, web interface, etc.)*
11. Virtual EQ
    a. Delay Analysis
    b. Virtual EQ
    c. Advanced EQ
12. System alignment – timing and tuning
    a. Why Are We Making Measurements
        i. Measure only what matters
        ii. Measure only what can be controlled
    b. Subwoofers and Mains
        i. Using Delay Analysis
    c. Mains and Full-Range Delays
        i. EQ each separate coverage system for good response
        ii. Using Delay Analysis or the IR and the precedence effect



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   d. Mains and Under Balcony-Fills
      i. EQ each separate coverage system for good response
      ii. Using Delay Analysis or the IR and the precedence effect
      iii. High pass filtering
   e. Mains and Front-Fills
      i. EQ each separate coverage system for good response
      ii. Using Delay Analysis or the IR and the precedence effect
      iii. High pass filtering

13. Phase
   a. Phase
      i. Run-time phase / time of flight / latency
      ii. Inherent phase of a DUT
   b. Phase of filters
   c. Group Delay

Day 2:

14. Field measurements of multiple loudspeaker systems
15. Reverberation time measurements
16. Intelligibility measurements
17. Advanced processing techniques

## Intended Audience

- New or existing users of SysTune
- System engineers and technicians looking for advanced tools and techniques
- Advanced users of measurement software
- It is highly recommended for participants to have worked through the SysTune tutorial



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