

EASE Seminar – Entry Level & Advanced Level

This is a general overview of our regular EASE Trainings. Please be aware that this document contains information on both levels we offer. Make sure which one is of interest to you before purchasing a class.

AFMG EASE Seminars are split into two main levels with Level 1 (entry level) being aimed at users of EASE JR or Standard and engineers beginning modeling with EASE. The course covers all important elements of the main program. Basic general information on acoustics and sound system design are given during the course as well but are not the main focus.

Level 2 continues seamlessly from Level 1, taking modeling with EASE to the advanced level. It is intended for EASE users with some experience or for the ones who want to start immediately with higher level projects including AURA and EARS modules. Additionally we offer Level 2+ which adds one day to Level 2 for those who need a refresher before they dive into the advanced level.

Agenda

Level 1, Day 1:

1. Introduction and overview
 - a. Class objectives *Establishing an understanding of theory, capabilities, limits and efficient use*
 - b. History and background of EASE
2. Basic program modules and general settings
 - a. Main module
 - i. Global materials
 - ii. Global speakers
 - iii. Absorption coefficient
 - iv. Often used F keys
3. Constructing and closing room models *Hands-on Model*
 - a. Establishing a folder
 - b. EASE model items
 - i. Vertices *Coordinates, duplicating and displacing*
 - ii. Faces *Boundary vertices, material, folds, coating, facing direction*
 - iii. Audience areas *Boundary nodes, shift*
 - iv. Listener's seats *Coordinates, orientation*

- c. Fast Entry methods
 - i. Prototypes
 - ii. Three-dimensional shapes *Cuboid, cylinder, cupola, pyramid, cone*
- d. Symmetric/non-symmetric models
4. Material database
 - a. Format of material data
 - b. Adding new materials *Interpolation*
5. Reverberation time formulae and their limits
6. RT optimization *Employing EASE to find the right acoustical treatment Hands-on Model*
7. Potential causes and remedy of holes
8. Pack the project
9. Listen to auralizations
10. Build a model on your own and investigate RT options

Level 1, Day 2:

11. Discuss and review model
12. Opening a packed project
13. Adding loudspeakers *Hands-on Model*
 - a. Position
 - b. Aiming angles and convention
 - c. Model
 - d. Power settings and alternatives *Broadband pink noise or multi-tone signal. Differences in SPK and GLL*
 - e. Installing loudspeakers
 - f. Naming loudspeakers
 - g. Isobars
14. Speaker database
 - a. Format of speaker data
 - i. Types of speaker data files *SPK, DLL and GLL*
 - ii. Attenuation table *Horizontal/vertical planes and interpolation*
 - b. Polar plots
 - c. Balloons
 - i. Interpretation of balloons
 - ii. Rendering balloons *Colored globes and shaped balloons*
 - iii. Phase balloons
 - d. Graphical representation of speaker data
 - i. Sensitivity
 - ii. Directivity index
 - iii. Frequency response

- e. Speaker cases
- 15. Calculations in Mapping
 - a. 2D vs. 3D
 - b. AURA vs. Standard *Hands-on Model. SPL, C50, STI, D/R, interference*
 - c. Delay
- 16. Key acoustic principles
- 17. Speech transmission index and other intelligibility indicators
- 18. Auralization of direct sound from Standard Mapping *Hands-on Model*
 - a. Probe with direct sound *Arrivals level and delay*
 - b. Using auralization of direct arrivals to check echoes

Level 1, Day 3: *(this will be the first day for participants of Level 2+)*

- 19. Advanced functions for faster and more efficient room modeling *Hands-on Model*
 - a. Objects
 - i. Definition *Items, reference point and angle*
 - ii. Advantages of using Objects *Group actions*
 - b. Tables
 - i. Different types of Tables
 - ii. Advantages of using Tables *Group actions*
- 20. Ray tracing *Reflections from selected face*
- 21. Introduction to AURA Mapping and AURA Response
- 22. Import/export functions
 - a. Advantages of using AutoCAD and SketchUp
Using architectural drawings, curved and non-uniform surfaces
 - b. 3D polylines and 3D faces
 - c. Examples
- 23. Vision

Level 2, Day 4:

- 24. Overview *Highlights on basic topics for advanced users starting with Level 2*
 - a. Room entry
 - b. Materials and speakers
 - c. Mapping
- 25. Material database: Scattering coefficients
- 26. GLL modeled speakers
 - a. Shortcomings of other methods *Configurable arrays, multi-way loudspeakers*
 - b. Advantages of the GLL solution

- 27. Loudspeaker clusters vs. arrays
 - a. Arrays
 - i. Building arrays
 - ii. Using Arrays *Individual components still accessible*
 - b. Clusters versus arrays
- 28. Ray tracing fundamentals
 - a. Motives and limits of ray tracing
 - b. Sound particles *Separability principle*
 - c. Concept
 - i. Classical ray tracing
 - ii. Mirror image method
 - iii. Hybrid method
 - d. Modeling of sources
 - i. Frequency dependence
 - ii. Space-angle dependence
 - e. Modeling of boundaries
 - i. Geometry
 - ii. Absorption
 - iii. Scattering
 - f. Modeling of medium
 - i. Spreading loss
 - ii. Air absorption
 - g. Modeling of receivers
- 29. Ray tracing impacts *Hands-on Model*
 - a. Concept and limits
 - b. Cut-off settings
 - i. Number of rays
 - ii. Travelling time
 - iii. Order
 - iv. Loss
 - c. Analysis in probe
 - i. Reflectogram
 - ii. Impulse response and ETC
 - iii. Waterfall view
 - iv. Hedgehog view
 - v. Reverberation time
 - vi. Energy ratios

- 30. AURA mapping / AURA response *Hands-on Model*
 - a. AURA versus classical ray tracing impacts
 - b. Calculation settings
 - i. Patch size
 - ii. Number of particles
 - iii. Length
 - iv. Maximum diameter after 1s
 - v. Diffuse rain
 - c. AURA Mapping results
 - i. Histogram and validity of calculations
 - ii. Maps
 - iii. Frequency and distribution perspectives
 - iv. STI options
 - v. File info
 - vi. Exporting results

Level 2, Day 5:

- 31. Auralization theory and procedure
 - a. Binaural hearing and HRTF
 - b. Impulse response and convolution
- 32. Auralization with EARS *Hands-on Model*
 - a. File formats
 - i. RSP files
 - ii. BIR files
 - iii. WAV files
 - b. HRTF balloons
 - c. Auralization
 - i. Convolver type
 - ii. FIR
 - iii. Input and output
 - d. Auralization of stereo systems
- 33. Accuracy/calculation-time trade-off for different calculation methods *Hands-on Model*
 - a. Discussion of the hands-on example results
- 34. Acoustic analysis of an EASE model
 - a. Case study
- 35. Comparing EASE model to measured results
 - a. Case study
- 36. What not to do when modeling with EASE

Intended Audience

Level 1

- New users of EASE Junior or EASE Standard; covers all functions available in EASE Junior.
- Users of EASE Evac, EASE Focus or EASE Address who want to investigate entry-level room acoustics.
- Users switching to EASE who have a background in other modeling software.
- It is highly recommended for participants to have worked through the EASE tutorial (sections 2-4, 7 and 9).

Level 2+

- Advanced users who need a refresher on how to work fast and efficiently in EASE.
- It is highly recommended for participants to have extensive experience modeling in EASE.

Level 2

- Advanced users who already know how to build a model in EASE and want to learn about advanced simulation and auralization.
- Advanced users who are interested in full-length, highly accurate AURA room acoustics calculations.
- It is highly recommended for participants to have attended the Level 1 or Level 2+ EASE Class.